Iohnson's Arithmatick

In 2. Bookes

THE FIRST, OF VULGARE ARITH
With diuers Briefe and Easie
rules: to worke all the first
4. partes of Arithmatick
in whole numbers and
fractions by the Author
newly Inuented

The Second, of Decimall Arithmatick
wherby all fractionall operations
are wrought in whole Numbers
in Marchants accomptes
without reduction; with
Interest, and Annuityes

The Second Edition enlarged in
many places thereof

Printed at London by
stine Mathewes and are
to be sold by

BRITISH MUSEUM

TO THE RIGHT Honourable Sir EDWARD BARKSHAM, Knight Lord Major of the City of *London*; and to the right Worshipfull, the Shriefes and Aldermen his Brethren.

THe very Arts (Right Honorable and Worshipfull) which were wont to beare the attributions of [*honestæ & liberales*] seeme now to temporize, and to have learned the new-found skill of equivocation. Yet howsoever the former of these denominations adhereth constantly unto the Professors of Mathematick Sciences, yet the other, which was once derived [*a liberalitate*] and then intimated, that they were anciently accustomed to performe liberall recompence to their lovers and followers, hath now (to spare cost) purchased a different etymologie [*a libertate*] as properly accommodate to such as are [*liberi*] freeborne, or (as our peculiar terme carrieth) Free-men. Which being so, and seeing that in this particular, as

wel as in many other of greater consequence, *Tempora mutantur* —: I am thereby enforced to make up the old verse, adding — & *nos mutamur in illis*; and to apply my long experience, together with tedious studies bestowed in this present Art of Numbers, to the use and behoose of those persons, to whom by the generall appellation it properly belongeth, namely, to the studious thereof in this honorable City. Which is the cause that I presume (without farther selfe-praise, of what I haue brought more usefull, more easie, or more certaine and delightfull in the operations, then hath beene seene before) to present my Labours to your Honourable and Worshipfull judgments, to whom I owe of duty, whatsoever can be of me performed, to the furtherance of Art, and the honour of this noble City, and the worthy Companies therein. 14 JU 59

Your *Honours*, and *Worships* devoted
in all humble respect,

IOHN IOHNSON,
Surveighor.

THE EPISTLE TO THE READER.

GEntle and Curteous Reader; having for many yeares past spent my time both in reading, practising, and conferring with others in, and about the studie of the Mathematicall Sciences, and through great paines & travell, at the request of divers Worshipfull Gentlemen, Merchants, & others of my very loving friends, I have at last collected and gathered together many excellent Rules and easie Abbreviations in the Science of Arithmatick, which at the entreaty, & by the meanes of the help of some of them, I have at last made bold heere to present abroad unto the worlds view, the first fruits of some idle houres studie, the most part whereof I doe acknowledge to have gotten by the practice and use of the most excellent Instrument, invented by Mr. William Pratt, called, The Iewell of Arithmatick; in which I have done the best of my Indeavours, not to hide that Talent in the earth, which God hath bestowed upon me for the benefit of others, but rather to his great glory and prayse, and for the benefit of my Country, and for the

furthering of all that are studious in the Art of Numbers, I have laboured to set it foorth in the most briefe, plaine, and easie manner that I could fit for the understanding of the weakest and meanest capacity. In which if any thing shall seeme obscure or doubtfull to any man, I could wish my selfe were present to resolve his doubts, for I have indeavoured to make the Rules as briefe, short & easie, as I could devise.

In my first Book I have intreated concerning vulgar Arithmatick, with new inventions of my owne, in all the first foure parts of Arithmatick, viz. in Addition and Subtraction, with two severall kinds of Multiplication, not charging of the memory, never extant before in any Author that I have read, with foure severall kinds of Division, the latter of them bringing the proofe by Addition of the figures under the dividend, [illegible] multiplication, or casting away of nines, according to the accustomed manner.

Againe, in the worke of Fractions, I have set them forth in plaine and perfit figures after another manner of my owne invention, because the fractionall figures in most bookes of Arithmatick were so unperfit, that they were scarce to be discerned, and in this manner they will performe all fractionall operations, as well as if they

they were set out according to the usuall manner. In the end of which Rules I have shewed the reasons and proofes of Fractions by the knowne parts of Coyne.

Thirdly, in the second part of the former book, I have set forth Reduction, both in Coyne sterling, waights, measures, time and motion; the Tables whereof are in the first part of the book, with divers Rules how to bring pence, or farthings at the first worke into pounds, shillings and pence; with divers questions wrought by Reduction, with Progression Arithmetical and Geometricall, with examples.

And lastly, I have shewed how to worke the Rule of 3 Direct and Converst, both in whole numbers and fractions, after divers severall manners of workings, and how to find the divisor in any question, as also divers wayes to work Fellowship, Barter, Exchange, Allegation, Interest, Position, and all other operations Arithmeticall, with examples and briefe Rules of every part.

In my second Booke of Decimall Arithmatick, I have first described out the parts and use of the decimall Table, and how to set forth any number given in Decimalls.

Secondly, I have shewed how to worke all the severall parts of Arithmatick, viz. Numeration,

ration, Addition, Subtraction, Multiplication and Division *in Decimalls; with examples and proofes of every worke in the knowne parts of Coyne.*

Thirdly, I have handled in as briefe manner as I could, the Rule of 3 Fellowship, Barter, Exchange and Interest in Decimall Arithmatick, as before in vulgar, in which you may perceive the great labour that is avoided, in vulgar Arithmatick, with divers examples and proofes of the same.

Lastly, I have added a small Treatise of Interest *and* Annuities; *with the manner how to calculate Tables or Breviats at any rate or yeares purchase given; all which I have drawn into a pocket vallume.*

And thus hoping of your friendly censure and acceptance of these first fruits of my labours, I cease, hoping to have my true indeavours and meaning well taken, and the faults in the Printing friendly amended, desiring a blessing from God upon these my poore labours, I take my leave. London

IOHN IOHNSON.

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The end of the Table.

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IOHNSONS ARITHMETICK.

CHAP. I.

Numeration.

NVmeration is the first part of Arithmeticke, which sheweth how to pronounce the value of any number of figures given; which are expressed by ten figures, whereof the tenth is a Cypher, signifying nothing of it selfe; but being joyned with figures, helpeth to increase the value: the figures are these;

one, two, three, foure, five, sixe, seven, eight, nine, cipher.

1. 2. 3. 4. 5. 6. 7. 8. 9. 0.

How to expresse the value of a number given.

If a number be given, whose value is to be expressed, you shall understand, that the figure next the right hand is the least in valew, and signifieth simply his owne valew, as the figure of 1 doth signifie but one, and the figure of 2 doth signifie but two, and the figure of 8 signifies but eight, and so of any other. And in the second place towards the left hand, every figure is in valew tenne, so that the figure of one there doth signifie tenne, the figure of 2 twenty, the figure of 8 eighty, and so of all other: in the third place towards the left hand, every figure is in valew one hundred, so that the figure 1 in that place signifies one hundred, the 2, two hundred, &c. In the fourth place, every figure is in valew one thousand, so there the figure of one signifies one thousand, the figure 2, two thousand, &c. In the fifth place, every figure is in value ten thousand: in the sixth place, one hundred thousand; and in the seventh place, one thousand thousands, or one million: in the eight place, tenne millions: in the ninth place, one hundred millions:

lions: in the tenth place, one thousand millions, or one milliot; and so infinitely names may be given to the valew of every pricke, as is usuall in the second part of Arithmetick, of Number, Square, Cube, surfolid, &c. or in Astronomicall Arithmetik, Primes, Seconds, Thirds, Fourths and Fifths, &c.

Now to expresse the valew of any number given, set a prick with the pen over the fourth figure towards the left hand, and over the seventh, and tenth; and so over every third figure towards the left hand, to the end of your figures, as in this Example:

Thousand. Millier. Mill. Thousand.

2 3 7 8 5 6 3 5 0 4 3 0 2 5 6 7

Now begin and expresse the first foure figures towards the right hand, as if they stood alone, which are 2567, or two thousand five hundred sixty seven. Then reade the figures belonging to the second pricke, which are 4302, as if they stood alone thus, foure millions three hundred two thousand five hundred sixty seven: then take the three figures belonging to the third prick, which

are 635, or sixe millions three hundred fifty foure millions three hundred and two thousand five hundred sixty seven: and so this whole summe is thus to be read, two hundred thirty seven thousand eight hundred fifty sixe millions three hundred fifty foure millions three hundred and two thousand five hundred and sixty seven: and so of any other summe.

CHAP. II.

Addition.

ADdition is the second part of Arithmatick, and serveth to adde or collect divers summes of severall denominations, and to expresse their totall value in one summe.

In Addition begin to adde your sums at the right hand with the smallest numbers or denominations first, and gathering of their totall mark how many of the smaller markes one of the next greater; as if your addition be Farthings, for every foure farthings carry one peny in minde to be added to the numbers in the place of pence, and for every 12

put one shilling into the number of shillings, and for every 20 shillings, one pound into the place of pounds; and therefore to know how many of the smaller denominations, makes one of the next greater: I have here added in this place the severall Tables of Coyne sterling, of Weights, of liquid Measures, and dry Measures, of long Measures, of Time and Motion; which are very necessary to be knowne of every Practicioner in Arithmatick, before he proceeds any further in the practise of Arithmatick, being used in every particular Rule of Arithmatick more or lesse.

The Table of Coyne Sterling.

	Pence	*Farth.*
Foure farthings makes one peny	1	4
One shilling is	12	48
One pound Sterling is 20 shillings	240	960
One hundred pound Sterling is	24000	96000

Example.

l.	*s.*	*d.*	*l.*	*s.*	*d.*	*q.*
785976.	17.	3.	324.	8.	11.	1
80254.	10.	7.	222.	17.	3.	1
23547.	11.	0.	187.	10.	2.	0
7853.	12.	2	354.	12.	1.	0
248.	00.	0.	1856.	00.	1.	0
93.	10.	1.	7859.	1.	11.	1
7.	11.	3.	3275.	1.	9.	0
Su. 897981.	12.	4.	14079.	12.	3.	3

The explanation of these examples.

In the first example toward the left hand I begin with farthings, which are 3, which I set downe: then next 9 pence and 11 is 20, and 2 is 22, and 1 makes 23, and 2 makes 25, and 3 makes 28, and 11 makes 39 pence, or 3 shillings 3 pence; I set downe the 3 pence, and carry in minde the 3 shillings to be added to the place of shillings. Then adde the severall summes of shillings, which are 1. 1. 2. 7. 8, the totall is 19, and the 3 in minde makes 22 shillings; set downe the 2 shillings, and keepe two tennes to be added to the tennes of shillings, which are 3 tens,

which makes 5 tennes, or 50 ſhillings; ſet downe the odde tenne to the two ſhillings, which makes 12 ſhillings, and carry 2 pound for the forty ſhillings to the next place of pounds, which are 5.9.6.4.7.2.4, and the 2 in minde makes 39; leave the 9 under the place of unites, and carry 3 tennes in minde, and 7.5.5.5.8.2.2, totall is 37; ſet downe the 7 under the place of tennes, and carry 3 in minde for the 30 tennes, which is 3 hundred: then 3 in minde, and 2.8.8.3.1.2.3, totall is 30; ſet a cypher, or 0 in the place of hundreds, and carry 3 for the 30 into the place of thouſands: then laſt of all, 3 in mind, and 3,7,1 makes 14 thouſand, and becauſe it is the laſt ſumme, you muſt ſet them all downe, placing the 4 under the place of thouſands, and the 1 one place more towards the left hand, and then the Totall ſumme of thoſe particulars will bee 14079 pound, 12 ſhillings, 3 pence, 3 farthings, as appeareth in the example; and in the like manner is the other example to be caſt up into one Totall: and ſo I will heere end with Addition of Coine, and put a ſeverall example of every table for the full Tables and perfect underſtanding of the ſaid table, which are of great uſe in all the ſeverall rules of Arithmetick.

The Table of Haberdepoyse weight.

Haberd. the pound.	*oun.*	*Dra.*	*Scrup.*	*Grai.*
One pound is ——	16	128	384	7680
One half pound is—	8	64	192	3840
One quarter of a— pound is ——	4	32	96	1920
One eighth of a— pound is ——	2	16	48	960
One sixteenth of a- pound is ——	1	8	24	480

The Hundred.	*Pou.*	*Oun.*	*Dra.*	*Scrup.*
One hundred is--	112	1792	14336	43008
One half hundred is ——	56	896	7168	21504
One quanter-- hundred is —	28	448	3534	10752
One half quarter hundred is -	14	224	1792	5376

Example

Example of Weights.

C.	qu.	li.	oun.	C.	q.	li.	oun.	dr.
27.	3.	27.	6	127.	3.	17.	8.	3.
18.	1.	17.	12.	118.	2.	10.	12.	1.
13.	2.	10.	3	33.	0.	0.	0.	0.
73.	0.	0.	5.	17.	1.	12.	2.	3.
83.	2.	5.	12.	22.	3.	1.	7.	0.
2	2	2		17.	0.	10.	3.	0.
				2	1	2		
217.	3.	6	6	336.	3.	24.	09.	7.

The Explanation.

In the Haberdepoyse waight, 20 graines makes one scruple, 3 scruples one drame, 8 drams one ounce, 16 ounces one pound, 112 pound is one hundred of the Haberdepoyse weight, wherby is sold all kind of Merchandise usuall in this Realme, and therefore in Addition of Waights Haberdepoyse, for every 3 scruples adde one drampe, and for every 8 drams one ounce, and for 16 ounces 1 pound, for 28 pound one quarter of a hundred, and for every 4 quarters one hundred. First, I begin with the drams in the first example to the right hand, which are 3.1.3, to-

tall is 7 drams, which I note downe underneath, becauſe they are leſſe then one ounce. Secondly, the ounces are 3,7,2,12,8. Totall is 32 ounces, or 2 pound, becauſe 16 ounces is one pound; which 2 I ſet under the place of pounds with a light touch of the penne for to remember it the better, and place a Cypher in the place of ounces. Thirdly, the pounds are 2, 10, 1, 12, 10, 17. Totall is 52 pound, which is one quarter of a hundred, and 24 pound, place 24 pound under the place of pounds, and put one quarter, as before in the place of quarters of hundreds. Fourthly, 1,3,1,2,3 quarters, are 10 quarters, or 2 hundred and 2 quarters, or halfe a hundred; place 2 quarters in the place of quarters, and put over 2 into the place of hundreds for the 8 quarters. Then 2, 7, 2, 7, 3, 8, 7 makes 36 hundred, place 6, and carry 3 for the 30: then ſay, 3,1,2,1,3,1,1, totall is 13; place 3 there, and carry one for the 10, which one in mind, and 1,1 makes 3, which ſet downe, and the totall is 336 hundred, 2 quarters, 24 pound, 0 ounces, 7 drammes; and ſo the other example is in the ſame manner to bee caſt up, and ſo of all other.

The Table of Liquid Measures.

	Pints.
One pound or pint	1
One quart	2
One pottle	4
One Gallon	8
8 Gallons, a Firkin of Ale, Sope, or Herring	64
One Firkin of Beere	72
One Firkin of Salmon, or Eles	85
2 Firkins, or one Kilderkin of Beere	128
2 Kilderkins, or one Barrell	250
One Tirce of wine	336
63 Gallons one Hogshed of wine	504
2 Hogsheads, or a Pipe or Butt	1008
2 Pipes, Butts, or a Tunne of wine	2016

The Table of Dry Measures.

	Pints.
One Pint	1
One Quart	2
One Pottle	4
One Gallon	8
One Pecke	16
4 Pecks one Bushell Land-Measure	64
5 Pecks, one Water-bushell	80
8 Bushels one Quarter	512
4 Quarters, or Chaulder	2048
5 Quarters one Waye	2560

The

The Table of Long Measures.

	Inch.
Three Barley Cornes in length, one Inch	1.
One Foote	12
One Yard, or 3 Foote	36
Or 3 Foote 9 Inches, an Englisſh Ell	45
Or 6 Foote one Fadom	72
Or 5 Yards and half, a Pole or Perch	198
Or one Perch in bredth, and 40 long, one Roode	198
Or 4 Perches breadth, and 40 long, an Acre of land	792
160 Square Perches, is one Acre	792
40 Roddes in length is one Furlong, and 8 Furlongs is an Engliſh Mile.	

The Table of Time.

	Minut.
One Minute	1
One Hower	60
One Day naturall, or 24 Howers	1440
One Weeke, or 7 Dayes	10080
One Moneth, or 4 Weeks, or 28 Dayes	40320
13 Moneths one Day 6 Houres, or 365 Dayes, one Yeare	525960

The

The Table of Motion.

360 Degrees, 21600 Minutes, 1296000 seconds	1 Signes.
30 Deg. 1800 min. 108000 sec.	1 Signe.
1 deg. 60 min. 3600 sec.	1 Degree.
1 min. is 60 sec.	1 Minute.
1 second	1 Second.
7776000 thirds make the 12 Signes	1 Third.
466560000 fourths makes the 12 Signes	1 Fourth.
27993600000 fifths is 12 signes	1 Fifth.
1679616000000 sixths is 12 Signes	1 Sixth.

The explanations of these Tables, and the examples following.

First, in the example of Acres, Roods and Perches; for 40 Perches put 1 Rood into the place of Roods, & for every 4 Roods 1 Acre:

Secondly, for every 4 quarters of Inch, take 1 Inch, and for every 12 Inches 1 Foot, and for every 3 Foote, one Yard.

Thirdly, for 16 pints take one pecke, and for every 4 peckes one Bushell, into the place of Bushels.

Fourth-

Fourthly, for every 8 pints of liquid measure, take one Gallon, and for every 63 Gallons one Hogshead.

Fifthly, in the example of time; for 60, minutes take one houre, and for 24 houres one day, and for 365 dayes, one yeere.

Sixthly, for 4 nayles take one quarter of a yard, and for 4 quarters one yard, &c.

Lastly, in the example of motion, for 60 thirds, take 1 second, & for 60 seconds take one minute, and for 60 minutes take one degree, and for 30 degrees take one Signe.

And this is the use of these Tables in Addition and Subtraction; for looke what you carry over in Addition, that you must borrow in Subtraction, I will heare adde examples of every kind, leaving the Reader to exercise himselfe by the Rules before taught.

Example.

Acres.	*Rood*	*Per.*	*Feete.*	*Inch.*	*Quart.*
127,	3,	21	124,	7,	3
246,	1,	13	246,	11,	4
17,	3,	22	134,	7,	3
27,	1,	8	120,	8,	0
37,	0,	17	72,	10,	2
2	2		3	2	
456.	2.	00	699.	9.	3.

Bushel,

Bushel,	Pecks,	Pints.	Yard.	Quar.	Nails.
127,	3,	1	127,	2,	3
256,	1,	7	359,	1,	4
345,	0,	0	152,	3,	0
184,	2,	10	16,	0,	0
1	1		1		
913.	3.	12	695.	3.	3.

Yeares,	dayes,	houres,	min.	seconds.
356,	245,	16,	35,	20
248,	100,	12,	30,	00
756,	12,	00,	10,	12
147,	27,	30,	25,	02
1618,	00,	20,	00,	00
1	1	1	1	
3120.	22.	07.	40.	34.

Signes,	degrees,	minutes,	seconds,	thirds,
11,	22,	32,	24,	18
8,	19,	17,	20,	12
10,	07,	00,	08,	15
2,	17,	35,	50,	59
3,	29,	30,	12,	00
3	1	1	1	
37.	05.	55.	55.	44.

The

The proofe of Addition.

The proofe of Addition is made by Subtraction; for if you subtract the numbers which you added from the totall of the Addition, there will remaine nothing, if the worke be truly done.

Example.

	l.	s.	d.	q.
	378567.	19.	10.	1.
	240023.	10.	2.	0.
	854326.	07.	1.	0.
	785634.	13.	3.	2.
	320500.	00.	11.	1.
Totall.	2579052.	11.	4.	0

First, adde together the greatest Summes in valew in the place of hundred thoulands, which makes 23, which take from 25, and there will remaine 2, then the figures in the fifth place, 26 taken from 27, there will remaine 1. Thirdly, the figures in the place

of

of thousands, makes 17, which taken from 19, leaves 2, then 19 in the place of hundreds taken from 20, leaves 1: and againe, 13 in the place of tennes from 15, leaves 2: and lastly, 20 in the place of unites from 22 pound, leaves 2 pound: then 49 shillings from 2 pound 11 shillings, leaves 2 shillings: also 2 shillings 3 pence in the place of pence, from 2 shillings 4 pence, leaves 1: and last of all, 4 farthings from 1 penny, leaves nothing, which prooves the worke to bee truly wrought.

	l.	*s.*	*d.*	*q.*
The totall.	2579052.	22.	4	0.
	222222.	2.	2.	0.

The second proofe of Addition.

Cut off the uppermost numbers with a dash of the pen, and add the remayner into one Totall; and then subtract that sum from the whole Totall, and the remayner will be the numbers which you cut off, if the worke be true, else not.

Example.

Example.

378567,	19,	10,	1	
240023,	10,	2,	0	
854326,	7,	1,	0	
785634,	13,	3,	2	
320500,	00,	11,	1	
	2	2		
The total 2579052,	11,	4,	0	*of all*
Subt. 2200484,	11,	5,	3	*the sum.*
The 378567,	19,	10,	1	*proofe.*

And so much shall suffice to have spoken of Addition, and the proofe thereof.

Questions of Addition.

What number is that, to the which if you doe adde 45, the totall will be 357.

Answer: Subtract 45 from 357, remaines 312.

Example.

357
45

312

What

What three numbers are those, to which if you adde 27, 36, and 45, their products shall be equall, and the summe arising shall be 120.

Proofe.

120	120	120	93
27	36	45	27
93	84	75	120

What number is that, to the which if you doe adde 354 pound, 7 shillings, 9 pence, the totall will be 512 pound, 15 shillings, 0 penny. Answer: Subtract 354 pound, 7 shillings, 9 pence, from 512 pound, 15 shillings, 0 penny, and the remainder will bee 158 pound, 7 shillings, 3 pence, which is the number that you doe seeke.

Example.

	l.	*s.*	*d.*
	512.	15.	0.
	354.	7.	9.
	158.	7.	3.

CHAP. III.

Subtraction.

SVbtraction serveth to deduct one summe from another; the lesser from the greater, and to shew the remaines.

Place your greater number, from which the Subtraction is to be made, in the uppermost part, and the number to be subtracted, or deducted right underneath every figure under his like kind, or denomination, *viz.* pounds under pounds, shillings under shillings, and pence under pence, &c. in this manner.

	l.	*s.*	*d.*	*q.*
Lent.	7756.	13.	10.	1.
Payd.	3949.	17.	11.	2.
Rest.	3806.	15.	10.	3.
Proo.	7756.	13.	10.	1.

Then begin your subtraction at the left hand, at the smalleſt numbers; but if the loweſt figure of the undermoſt numbers be

the

the greateſt, that it cannot be abated out of the number above it, then adde one of your next greater denomination, and make your ſubtraction from both, noting the remainer: as if you have 10 pence to take from 7 pence, adde one ſhilling, or 12 pence, unto 7 pence, that maketh 19 pence; then take 10 pence from 19 pence, and there will remaine 9 pence, which note downe under the 10 pence: and becauſe you did borrow one ſhilling, therefore in the number of ſhillings you ſhall take away one more then it is, in the next place of ſhillings, and this rule is generall, in Coyne, Meaſure, Time, Motion, or any other thing elſe whatſoever.

1. *Example of Subtraction of Coyne.*

	l.	*s.*	*d.*	*q.*
Lent.	789786.	17.	11.	3.
Paid.	692583.	19.	10.	1.
Reſt.	97202	18.	1.	2.
Proo.	789786.	17.	11.	3.

2. *Example*

2 Example of Weights.

	C.	q.	li.	oun.
Lent.	127.	3.	27.	10.
Paid.	38.	2.	24.	15.
Reſt.	89.	1.	2.	11.
Proof.	127.	3.	27.	10.

3. Example of Time.

	Yeres,	daies,	houres,	min.
Tot.	1618.	340.	20.	56.
Ded.	1581.	122.	15.	19.
Reſt.	0037.	218.	04.	57.
Pro.	1618.	340.	20.	56.

4. Example of Motion.

	Sig.	Deg.	Min.	Second.	Thirds.
Tot.	11.	22.	36.	52.	40.
Subt.	7.	29.	51.	42.	56.
Reſt.	3.	22.	45.	09.	44.
Pro.	11.	22.	36	52.	40.

170240

The explanation of these Examples.

In the first example of Coyne, begin your Subtraction at the right hand, saying; 1 farthing from 3 farthings, leaves 2 farthings, which note downe under the 1 farthing. Then 10 pence from 11 pence, leaves 1 penny. Thirdly, 19 shillings from 17 shillings you cannot have, therefore take one pound; or 20 shillings, and adde to 19 shillings, saying, 19 shillings from 37 shillings, rests 18 shillings, which note downe. Then 1 that you borrowed, and 3 pound, is 4 pound from 6 pound, leaves 2 pound to set downe under 3. Then 8 from 8 leaves nothing, place there a Cypher, or 0 under 8. Then 5 from 7 rests 2; then 2 from 9 leaves 7, which also note againe; 9 from 8 cannot be taken, then make it 10 more, and say 9 from 18 leaves 9, which set downe: and last of all, 1 borrowed and 6 is 7, from 7 leaves nothing, and the worke is ended, and the remayner will bee 97102 pound 18 shillings 1 penny 2 farthings, as appeareth in the example before going.

The exposition of the second Example.

First, take 15 ounces from 10, which cannot

not be, then adde 1 pound, or 16 ounces to 10, makes 26; then say, 15 from 26 leaves 11 ounces, which note downe: then 1 borrowed, and 24 is 25, from 27 pound leaves 2 pound remaining; then 2 quarters from 3 quarters, leaves 1 quarter remaining; then 8 from 7 cannot be, therefore take 8 from 17, rest 9, which note downe: then one borrowed and 3 makes 4, from 12 rests 8, and the worke is done, and the remaine is 89 hundred 1 quarter 2 pound 11 ounces.

3. Example.

First, take 59 minutes from 56 minutes cannot be, but then take 59 minutes from 60 minutes, or 1 houre, and there will remaine 1 minute, which adde to 56 minutes, and that will make 57 minutes, which note downe on the place of minutes: then borrowed and 15 houres makes 16 houres, which taken from 20 houres leaves 4 which note under the 15; and then 2 dayes from 0 cannot be, but 2 from 10, and there will remaine 8, which note downe: then 1 borrowed and 2 makes 3, from 4 leaves 1; also 1 from 3 leaves 2; lastly, 1 from 8 leaves 7, and 8 from 11 leaves 3; then 1 borrowed and 15 makes 16, from 16 leaves nothing,

and

and the remaynder will bee 37 yeares 218 dayes 4 houres 57 minutes; the like is done in the other example of Motion, and therefore here needlesse to be rehearsed.

To subtract from a Vnite.

Set downe with your pen a Vnite in any place, adding Cyphers unto it, and the severall numbers which you will subtract from it of pounds, shillings and pence right underneath: then note what each severall number of your lowest numbers doth want of 9 unto the place of Vnites, and set that right under for the remayner: and lastly, note what your shillings and pence doth want of 20 shillings, and set that downe for your remayner, and the worke is ended.

Example.

	l.	*s.*	*d.*
Lent.	1000000.	00.	00.
Payd.	232864.	17.	03.
Rest.	767135.	2.	9.
Proo.	1000000.	00.	0.

The proofe of Subtraction.

The ſureſt proofe of Subtraction is made by Addition; for if you doe adde the numbers remaining, untol the numbers deducted, they will returne your former Summe, if the worke be truly wrought, as will appeare in the proofe of all the ſeverall examples before going, and therefore here againe in this place needeleſſe to be rehearſed. Only I will adde one for examples ſake.

In the laſt example, the numbers which did remaine, were 767135 pound 2 ſhillings 9 pence, and the numbers deducted, 232864 pound 17 ſhillings 3 pence; theſe two numbers added together, ought to make a unite in the ſeventh place; wherefore I adde 9 pence to 3 pence, makes 1 ſhilling; and 1 ſhilling to 17 ſhillings, makes 18 ſhillings, and 2 ſhillings makes 20 ſhillings; then 1 and 4 is 5, and 5 is 10, which is one in the next place: then 1 and 3, and 6 is 10; and 1.1.8 makes 10, and 1.7.2 makes 10, and 1.6.3 is 10, and laſtly 1.7.2 makes 10, or one unite.

Mul-

CHAP. IIII.

The Table of Multiplication.

1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72
9	18	27	36	45	54	63	72	81

This Table of Multiplication must bee learned perfectly by heart, for to know readily what the multiplication of any two digit numbers under nine, or unto nine doe make, and then Multiplication will be very easie: for Multiplication is a number of additions speedily performed, as if you should say, How many in number is 8 times 7, if you

you ſhould ſet downe 7 eight times one under another, and adde them together, the totall will bee 56: but if you looke in the Table for 8 in the head, and 7 in the ſide, you ſhall finde under 8, right againſt 7 in the ſame parallell 56; or if you find 8 in the ſide, and 7 in the head, the like number will appeare, and theſe numbers in the Table are to be fixt in memory.

1 Example according to the uſuall way.

87958. *The Multiplicand.*
987. *The Multiplier.*

Firſt, beginne your multiplication at the right hand, ſaying, 7 times 8 make 56, place 6 under the 7, and keepe 5 in minde, to bee added to the Product of the Multiplication of 7 by 6, ſaying, 7 by 6 makes 42, and 5 in minde is 47; ſet 7 downe under the 6, and keepe 4 in minde: then 7 by 9 is 63, and 4 makes 67; ſet 7 downe, and keepe 6 in mind: then 7 by 7 is 49, and 6 is 55; place 5 and keepe 5 in minde: laſtly, 7 by 8 is 56, and 5 is 61, which ſet downe the 1 firſt, and the 6 one place more towards the right hand;

and

and so the multiplication by the first figure 7 is done, then cancell the 7 of your multiplyer, and your worke will stand, as in this example.

87968
987
615776

Secondly, begin with 8, the second figure of your multiplier, saying, 8 times 8 is 64; place the 4 under the said 8, and keepe the 6 in mind: then 8 by 6 is 48, and 6 makes 54; set downe 4 in the next place, and keepe 5 in mind: then 8 by 9 is 72, and 5 makes 77; set downe 7, and keepe 7 in mind: then 8 by 7 is 56, and 7 makes 63; set downe 3, and keepe 6. Lastly, 8 by 8 is 64, and 6 makes 70, set the 0 first, and the 7 one place more towards the left hand, and cancell the 8 of your multiplier, and the worke will stand thus.

87968
987
615776
703744

Thirdly,

Thirdly, beginne with 9, the last figure of your multiplyer, saying, 9 by 8 is 72; place the 2 under the said 9, and keepe 7: then 9 by 6 is 54, and 7 is 61; place 1, and keepe 6: then 9 by 9 is 81, and 6 is 87; place 7, and keepe 8: then 9 by 7 is 63, and 8 is 71: place 1, and keepe 7: last of all, 9 by 8 is 72, and 7 is 79; place the 9 first, and the 7 one place more towards the right hand, and the whole worke is ended, then gather the totall by addition.

1. *Example.*

87968	*multiplicand*
987	*multiplier.*
615776	
703744	
791712	
86824416	

2. *example*

2 Examples with Cyphers.

703286501
32057

49230055507
3516432505
140657300020
21098595003

22545255362557

The exposition of this Example.

First, 7 by 1 is 7, which note downe: then 7 by 0 is nothing, set down a 0 in that place: and next 7 by 5 is 35, set 5, and carry 3: then 7 by 6 is 42, and 3 is 45, place 5, and carry 4: then 7 by 8 is 56, and 4 is 60, set downe a 0, and carry 6 againe: 7 by 2 is 14, and 6 makes 20, set downe a 0, and carry 2: then 7 by 3 is 21, and 2 makes 23, place 3, and carry 2: then 7 by 0 is 0, leaue the 2 in that place: then lastly, 7 by 7 is 49, being the last number, set downe all the 9 under 7, and

the 4 one place more to the left hand, and the worke will then ſtand thus.

```
  703286501
      32057
  ---------
 4923005507
```

Secondly, cancell 7, and then ſay, 5 by 1 makes 5, place that 5 under the 0; and then 5 by 0 is 0, place a 0 under the 5 in the next place; and then 5 by 5 is 25, ſet downe 5, and carry 2: then 5 by 6 is 30, and 2 makes 32, ſet downe 2, and carry 3: then 5 by 8 is 40, and three makes 43, place 3, and carry 4: alſo 5 by 2 is 10, and 4 makes 14, ſet downe 4, and carry 1: then 5 by 3 is 15, and 1 makes 16, ſet downe 6, and carry 1: then 5 by 0 is 0, ſet downe the 1 there: laſt of all, 5 by 7 is 35, ſet them all downe, and the work will then ſtand thus.

```
  703286501
      32057
  ---------
 4923005507
35164325O5
```

Thirdly,

Thirdly, cancell the 5, and then say, o by 1 is o, place a o under the o of your multiplier, and then proceed to the next figure of your multiplier 5 which is 2, saying, 2 by 1 is 2, place the 2 under the said 2 of your multiplier: then 2 by o is o, which set downe: then 2 by 5, makes 10, set downe a o, and carry 1: then 2 by 6 is 12, and 1 is 13, set downe 3, and carry 1: also 2 by 8 is 16, and 1 is 17, set downe 7, and carry 1: also 2 by 2 is 4, and 1 makes 5, which set downe: againe, 2 by 3 is 6, which set downe: lastly, by 7 is 14, which set downe, and the worke will stand as in this example.

703286501
320857
4923005507
3516432505
1406573002o

Fourthly, cancell the 2, and say, 3 by 1 is 3, which place right under the said 3: then 3 by o is o, and worke in all respects as before, and the worke being ended will stand thus.

7032186501
32057

49230955107
33516432505
14065730210
21098595315

225452553625557

I will heere adde some few examples to be wrought by the penne, without any troubling of the memory with bearing ought in mind.

Example.

87968 *multiplicand.*
987 *multiplier.*

46456
56932
57464
64628
68572
73344

Product. 868244616

2 *Example.*

79648039 *multiplicand.*
8976 *multiplier.*

532401 54
42464808
6425 0268
498286 01
8137028 1
631462 07
74360272
562824 04

71492079 8064 *Product.*

The explanation of the worke by the pen, without charging the Memory.

The first Example.

3796 8
987

First, I multiply all the figures of my multiplicand

tiplicand by 7, the loweſt figure of my multiplier, ſaying, 7 by 8 is 56, put 6 under the 7, and 5 under the 8: then 7 by 6 is 42, leave the 2 under 5 laſt placed, and ſet the 4 one place more towards the left hand under the 9: then 7 by 9 is 63, leave 3 under the 4 laſt placed, and ſet 6 one place more to the left hand under 7: then 7 by 7 is 49, leave 9 under the 6 laſt placed, and the 4, ſet one place more to the left hand under the 8: laſtly, 7 by 8, makes 56, leave 6 under the 4, & place 5 one ſpace more to the left hand, as before, then cancell 7 of your multiplier, and the multiplication by the firſt figure is ended, and the worke will ſtand thus.

Example.

8 7 9 6 8
9 8 7
---
4 6 4 5 6
5 6 9 3 2

Then for the ſecond worke, ſay, 8 by 8 is 64, place 4 under the ſaid 8, and put 6 under the next figure 3: then 8 by 6 makes 48, leave 8 under 6, and put 4 under the next 9: and

and so working in all respects as at the first, and your second worke will stand thus, as in this example.

87968
987

46456
56932
57464
64628

Lastly, cancell 8 your multiplier, and then multiply by 9, as is before taught, placing the first figure of your product under the figure multiplying, and the worke being ended it will stand thus; and lastly, gathering the totall by addition, it is 86824416; as in this example.

87968
987

46456
56932
57464
64628
68572
72304

Product. 86824416

Ther

There is no difficulty in this kind of worke, but onely when there falls a o in the multiplicand, or multiplier; for if there be a cypher, then you must fill up the places as you worke, either with pricks, or cyphers, as if you had figures to set in their places, and the rest of the worke is, as before is taught in the third example; but I will heere adde one example, having all the difficulties that may happen, for the better understanding thereof.

Example.

	70921034
	1293
	02000012
	21076309
	081002 36
	6306 18907
	60100000 08
	14084206
	70921034
Product	91700896962

Example.

Example.

8007390214736 8

179852

0010100001011 6

1600468042846 2

0003140102313 4 2

4005500505150 0

0052700103524 6 4

6400642068264 8

0006280103625 7 2

7200371089637 4

1440145144900 8 4 2 9 5 3 6

How to multiply, and to bring the Product in the Last line.

Place your numbers right one under the other, as in the common way; then make a right line somewhat distant from the first numbers with your penne, as in the example following.

87968
987
5645

615776

Then beginne and say, 7 by 8 is 56, place the 6 under the line under the 7, and the 5 above the line in a smaller figure in the next place towards the left hand: then 7 by 6 is 42, and the 5 above the line makes 47, leave 7 under the 8, and set the 4 againe above the line: then 7 by 9 is 63, and the 4 above the line makes 67, place 7 there, and set the 6 in the next place above the line: then 7 by 7 is 49, and 6 above the line makes 55, leave 5 there, and put 5 againe over the line: lastly, 7 by 8 makes 56, and the 5 last placed makes 61, place that whole summe under the line, and the worke will stand as above in the example.

Secondly, draw a line againe a little distant, as before from the last product, as in the example following.

Example.

Example.

87968
987
5645

61577|6
68670|

765321

Then say, 8 by 8 is 64, and 7 makes 71, place 1 under the 7, and set 7 above the line: then 8 by 6 is 48, and the two seavens betweene lines makes 62, place 2 under the 7, and set 6 againe over the line: then 8 by 9 is 72, and 6 makes 78, and 5 makes 83, place 3 under the line, and 8 above the line: then 8 by 7 is 56, and 8 makes 64, and 1 makes 65; place 5 under the line, and set 6 above: lastly, 8 by 8 is 64, and 6 makes 70, and 6 makes 76, place them both downe; and the worke will stand as above in the example.

Thirdly, draw a line againe, as before, a little distant from the last product, as in this example.

Example.

87968
987
56 45

615776

Then beginne and say, 7 by 8 is 56, place the 6 under the line under the 7, and the 5 above the line in a smaller figure in the next place towards the left hand: then 7 by 6 is 42, and the 5 above the line makes 47, leave 7 under the 8, and set the 4 againe above the line: then 7 by 9 is 63, and the 4 above the line makes 67, place 7 there, and set the 6 in the next place above the line: then 7 by 7 is 49, and 6 above the line makes 55, leave 5 there, and put 5 againe over the line: lastly, 7 by 8 makes 56, and the 5 last placed makes 61, place that whole summe under the line, and the worke will stand as above in the example.

Secondly, draw a line againe a little distant, as before from the last product, as in the example following.

Example.

Example.

87968
987
5645

615776
68670

765321

Then say, 8 by 8 is 64, and 7 makes 71, place 1 under the 7, and set 7 above the line: then 8 by 6 is 48, and the two seavens betweene lines makes 62, place 2 under the 7, and set 6 againe over the line: then 8 by 9 is 72, and 6 makes 78, and 5 makes 83, place 3 under the line, and 8 above the line: then 8 by 7 is 56, and 8 makes 64, and 1 makes 65; place 5 under the line, and set 6 above: lastly, 8 by 8 is 64, and 6 makes 70, and 6 makes 76, place them both downe; and the worke will stand as above in the example.

Thirdly, draw a line againe, as before, a little distant from the last product, as in this example.

Example.

Example.

87968
987
5645

615776
68670

765321
7967

868244 16 *Product*

Thirdly, say 9 by 8 is 72, and 2 makes 74, place 4, and put 7 over the line: then 9 by 6 is 54, and 10 makes 64, place 4 under the line, and put 6 above: then 9 by 9 is 81, and 11 above makes 92, leave 2 under the line, and 9 over the line: then 9 by 8 is 63, and 15 makes 78, leave 8 under the line, and 7 above: lastly, 9 by 8 is 72, and 14 makes 86, place them both under the line, and then bring downe the two figures which are cut off by two right-downe lines, which are 1 and 6, and the worke is ended, and the work will stand, as appeareth in the example above

above, and the totall Product is in the last line, 86824416; and this doth not charge the memory, for all the figures are set down in view, and to be seene at the first sight, and this is the second kind of multiplication, without charging of the memory.

```
                79648039
                    8978
                5324025
-------------------------
            47788823 | 4
            76461260 |
-------------------------
           605325090 | 6
            86470390 |
-------------------------
           777374890 | 0
            85470370 |
-------------------------
        7149217980640
-------------------------
```

Divi-

Chap. V.

Division.

SEt your Dividend, which is the number to be divided in the upper part, and the Divisor next to the left hand, under the greateſt figures in value of your Dividend: If the upper numbers be greater then the lower, or elſe place your diviſor one place more towards your right hand, as in this example.

Quotient.

Dividend. 78567 (
Diviſor. 84

If you would divide 78567 by 84, place them as above; for becauſe you cannot have 8 out of 7 in the Dividend, therefore place your 8 one place more towards the right hand, and the 4 next to it, and your quotient you muſt place at the right ſide of your numbers behind a crooked line. But I will firſt give an example of Diviſion by one figure: I would divide 65490 pound amongſt 5 men; place your numbers thus.

Example.

Example.

2044
65490 (13098 *The quotient.*
55555

First, I ſeeke how oft 5 is in 6, this I may have but once; then put 1 in the quotient beyond the crooked line, and take 5 out of 6, and there will reſt 1, ſet that over 6, and then remove your diuiſor one place more to the right hand, and then ſeeke you how many times 5 may be had in 15, and the anſwer is, thrice, therefore place 3 in the quotient, and by it multiply your diuiſor 5, makes 15, which taken out of 15, leaues nothing, place a 0 over the 5, and remoove your diuiſor, and ſeeke how oft you may haue 5 in the 4 over it, but you cannot haue it once; wherefore put a 0 in the quotient, and remoove your diuiſor, and ſeek how many times you may haue 5 in the figures over and behind it, which are 49, and you may haue it nine times, put 9 in the quotient, and by it multiply your diuiſor 5, makes 45, which taken from 49, leaues 4, which place above the 9. And laſtly, remoove againe your Diuiſor 5 under

under the 0, and seeke how many times 5 is in 40, and you shall find it 8 times, place 8 in the quotient, and by it multiply 5, makes 40 which taken from 40, leaves nothing remaining and the worke is ended, and will stand thus, as in the example, and I find, if I divide 65490 pound amongst 5 men, every man shall have for his part 13098 pound.

5 | 65490 (13098
  | 55
  | 99
  | 90
  | 90

And this is the order of Division for one figure: but if your Divisor doe consist of more figures then one, then you must take the first figuer of your Divisor no other out of the Dividend, then you can also take every severall figure of your Divisor, out of the same figures of the Dividend standing above them, as for example.

If you would divide 868244 16 by 987, which was one of the products of the multiplications in the rules before going, for a triall of your former worke, then place your numbers, as in the example following.

Example.

Example.

8682416 (8

987

Then I seeke how oft I may have 9 in 86, I find I may have it 9 times; but if I consider the next figure 8 of my Divisor, I cannot have also 9 times 8 out of the numbers remaining; if I take 9 times 9, which is 81, out of 86, there will remaine but 5; and then 9 times 8, the next figure of my divisor, makes 72, which cannot be taken out of 58 which will remaine; therefore I place 8 in the quotient, and by that I multiply all the figures of my Divisor, 987 makes 7896, which taken from 8682, leaves 786 above them: and the worke will stand thus.

786

8682416 (8

987

7896

Secondly,

under the 0, and seeke how many times 5 is in 40, and you shall find it 8 times, place 8 in the quotient, and by it multiply 5, makes 40 which taken from 40, leaves nothing remaining and the worke is ended, and will stand thus, as in the example, and I find, if I divide 65490 pound amongst 5 men, every man shall have for his part 13098 pound.

```
 2944
65490 (13098
 55555
```

And this is the order of Division for one figure: but if your Divisor doe consist of more figures then one, then you must take the first figuer of your Divisor no other out of the Dividend, then you can also take every severall figure of your Divisor, out of the same figures of the Dividend standing above them, as for example.

If you would divide 86824416 by 987, which was one of the products of the multiplications in the rules before going, for a triall of your former worke, then place your numbers, as in the example following.

Example.

Example.

8682416 (8

987

Then I ſeeke how oft I may have 9 in 86, I find I may have it 9 times; but if I conſider the next figure 8 of my Diuiſor, I cannot have alſo 9 times 8 out of the numbers remaining; if I take 9 times 9, which is 81, out of 86, there will remaine but 5; and then 9 times 8, the next figure of my diuiſor, makes 72, which cannot be taken out of 58 which will remaine; therefore I place 8 in the quotient, and by that I multiply all the figures of my Diuiſor, 987 makes 7896, which taken from 8682, leaues 786 above them: and the worke will ſtand thus.

786

8682416 (8

987

7896

Secondly,

Secondly, I remoove my diuiſor 987 one place nearer the right hand, and then I ſeeke how oft I may have 9 in 78, which I ſee I can have but 7 times, ſo I put 7 in the Quotient, and by that 7, I multiply my Diuiſor 987, makes 6909, which taken from 7864, the numbers above them there will remaine 955, and the worke will ſtand thus.

Example.

95
7865
868244 16 (87
9877
78969
698
80

Thirdly, againe I remove my diuiſor 987 one place nearer the right hand, and ſeeke how many times I may have 9 in 95, and I find I may have it 9 times, which 9 I ſet into the Quotient, and by it multiply 987, makes 8883, which taken from 9554 leaves 671, and the worke will ſtand thus.

Example.

Example.

67
995
78651

8682441 6 (879

9877
7896 93
8 9 8
88

Fourthly, I remoove my Divisor againe, and seeke how oft I may have 9 in 67, and I see I can have it but 6 times, then I put 6 in the quotient, and by it multiply 987, makes 5922, which taken from 6711, leaves 789, and the worke will stand in the example following.

Example.

67
9558
7865x9

8682446 (8796

98777
78966x
8988
88z
59

Laſtly, I remoove my Diviſor againe, and ſeeke how oft I may have 9 in 78, and I find I may have it 8 times, which 8 I put into the quotient, and by it I multiply my Diviſor 987 makes 7896, equall unto the numbers above; and ſo being taken away, leaves nothing remaining, and prooves the multiplication to be truely wrought, as appeareth in the example following.

Example

Example.

```
      67
    9558
  786529
-----------
868244216 (87968
-----------
  98777777
 789693227
   898886
    8929
     599
      78.
```

The third example of Division.

The second kind of Division is this: first, place your dividend and divisor, as in the former Examples, and then having found out the figure of your quotient, begin with the least figure of your divisor towards the right hand first, and multiply that by the figure of the quotient found, and then subtract the sum of the multiplication of that figure from the figure above the same, if it exceed not 9; but if the product be above 9, then for

every 10 beare one in mind to bee added to the product of the multiplication of the second figure of your Divisor by the quotient; and so in all respects worke for every other figure, and you shall need make no more figures above your Dividend then necessity shall require, as for example.

I would divide the product of the multiplication in the former Chapter of 79648039 by 8976, which was found to be as followeth, *viz.* 714920798064 by 8976: first, I place my Dividend and Divisor as followeth.

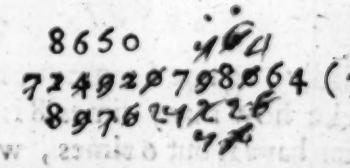
Quotient.

Dividen. 714920798064 (7

Divisor. 8976

Then first I seeke how often I may have 8 in 71, I find by tryall I can have it but 7 times; then having placed 7 in the Quotient, I first multiply 6, the least, or smallest figure in value by 7, makes 42; then I say, 42 from 42, rest 0, and carry 4 for the forty in mind; then I cancell the 2 over the 6, and place a 0 in the roome over it. Secondly, I say, 7 by 7 is 49, and 4 in mind makes

53, from 59 leaves 6, and carry 5; cancell the 9, and place 6 ouer it. Thirdly, 7 by 9 is 63, and 5 in mind is 68, from 74 leaves 6, and carry 7, cancell the 4, and place 6 above it: also 7 by 8 is 56, and 7 makes 63, which taken from 71, leaues 8 remaining, which 8 place over the 1, and cancell the 71, and the first worke will stand thus.



Secondly, I remove my Diuisor 397 [illegible] and I seeke, how many times I may have 8 in 86 I find 9 times; then I multiply 6 by 9 placed in the Quotient, makes 54, which taken from 60, leaves 6; place 6 above the first 0, and carry 6 for the 60: then say, 9 by 7 is 63, and 6 in mind makes 69, from 70 leaues 1, and carry 7 in mind; cancell the 0 over the 7, and place the 1 over the 0. Againe, 9 by 9 is 81, and 7 in mind is 88, which taken from 96, leaues 8 to bee placed above the first 6, and carry 9 in mind: lastly, 9 by 8 is 72, and 9 makes 81, which taken from 86, leaues 5 to bee placed above the 6, and the worke will stand as followeth.

Example.

```
      581
    86606
7249207 98064 (79
  89766
    897
```

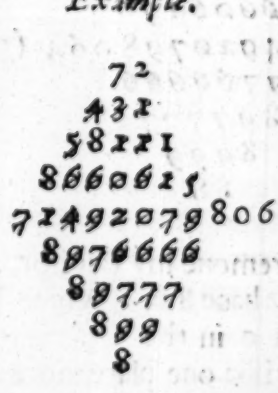
Thirdly, againe I remoove my Diuiſor and ſeeke how many times 8 is in 58, and I find I can have it but 6 times, which I place in the Quotient: then I ſay, 6 by 6 makes 36, from 37 leaues 1 above 7, and carry 3: then 6 by 7 is 42, and 3 is 45, from 45 leaues 1, above the 6, and carry 4: againe, 6 by 9 is 54, and 4 makes 58, from 61 leaues 3 above the 1, and carry 6. Laſtly, 6 by 8 is 48, and 6 makes 54, from 58 leaues 4, and the worke ſtands thus, as in this example.

```
      43
    5821
    86661
7249207 98064 (796
  8976
    897
     89
```

Fourthly,

Fourthly, I remove my Diuiſor, and ſeeke how oft I may have 8 in 43, and I find but 4 times, I place 4 in the Quotient. Then 4 by 6 makes 24, from 29, leaues 5, and carry 2, ſet 5 over the 9: then 4 by 7 is 28, and 2 makes 30, from 31, leaues 1, and carry 3. Againe, 4 by 9 is 36, and 3 makes 39, from 41 leaues 2, and carry 4. Laſtly, 4 by 8 is 32, and 4 is 36, from 43, leaues 7, and the worke will then ſtand thus.

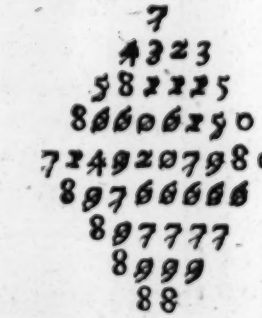
Example.



Fifthly, I remoove my Diuiſor, and ſeeke how oft I may have 8 in 72; I find 8 times, which placed in the quotient, I multiply 6 by 8, makes 48, from 48, leaues 0, and carry 4: then 8 by 7 makes 56, and 4 is 60, from

65 leaues 5, and carry 6: then 8 by 9 is 72, and 6 makes 78, from 81, leaues 3, and carry 8: then 8 by 8 makes 64, and 8, is 72, from 72 leaues 0 remaining, and the worke will ſtand thus.

Example.



Sixthly, I remoue my Diviſor, and ſeeke how oft I may haue 8 in 3, which I find not once; I place a 0 in the Quorient, and remoue my Diviſor one place more and ſeeke how many times 8 is in 35; I find I can haue it but 3 times, I place 3 in the Quotient beyond the 0 laſt placed, and ſay, 3 by 6 is 18, from 26 reſts 8, and carry 2: then 3 by 7 is 21, and 2 is 23, from 30 leaues 7, and carry

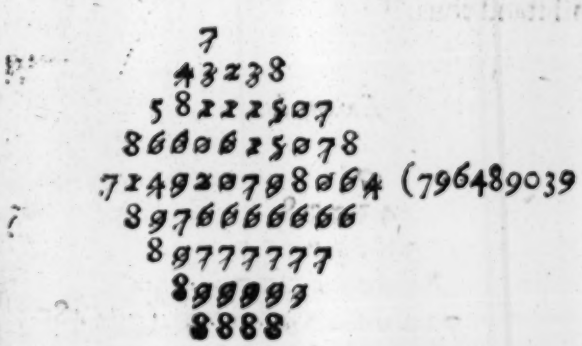
cary 3 : againe, 3 by 9 is 27, and 3 is 30, from 30 leaues a 0, and carry 3 : alſo 3 by 8 is 24, and 3 is 27, from 35 leaues 8 ; and the worke will ſtand thus.

Example.

7
43238
5811507
8660615078
7149207980064 (7964803
8976666666
8777777
899999
8888

Laſtly, I remoue my Diuiſor, and ſeeke how oft I may haue 8 in 80; I find 9 times, I place 9 in the Quotient, and ſay, 9 by 6 is 54, from 54 leaues 0, & carry 5 : then 9 by 7 is 63, and 5 is 68, from 68 leaues 0, & carry 6 : Then 9 by 9 is 81, and 6 is 87, from 87 leaues 0, and carry 8 : laſt of all, 9 by 8 is 72, and 8 makes 80, from 80 there will remaine nothing but cyphers, and the worke is quite ended, and will ſtand, as in the example following.

Example.



The fourth and last kind of Division, is the most absolute, speedy, and easie, not charging the memory at all, with keeping any numbers in mind; and also the proofe of your worke is made by Addition, and not by multiplication, as hath heeretofore beene commonly used, but the figures of your worke are by Addition, the proofe of your worke, as shall appeare by examples following.

The third Worke.

First, place your Dividend betweene two parallell lines, & your Quotient at the right side of your Dividend, behind a crooked

ne, as before; then place your Diuiſor next to the left hand of your Dividend, behind a perpendicular line: and laſtly, marke how many figures your Diuiſor hath, and in the roome of thoſe figures place Ciphers under the figures of your Dividend, ſo many as your Diuiſor hath figures, as in the laſt example; which I will againe repeate in this place, and worke it by this kinde of Diuiſion, making the proofe of the worke by Addition of the ſame figures.

Example.

Diuiſor.	*Dividend.*	*Quotient.*
8976	7149207980 64	(
	0000	

Firſt, I poynt to the firſt Cipher towards the left hand, and ſeeke how oft I may have 8, the greateſt figure in value of my Diuiſor, having reſpect to the other figures of my Diuiſor, to take them alſo as often, out of the figures above, and I find I can have it but 7 times, which 7 I place in the Quotient, and

by

by that 7 I multiply my Divisor 8976, saying first, 7 by 6 is 42, place the 2 under the lowest cypher towards the right hand, and carry 4: then 7 by 7 is 49, and 4 is 53, set 3 under the next place to the left hand, and carry 5: then 7 by 9 is 63, and 5 is 68, place the 8 in the next place, and carry 6. Lastly, 7 by 8 is 56, and 6 in mind makes 62, which place downe in their places, and the totall is 62832, to be subtracted from 71492, and there will remaine 8660; and the worke will stand thus.

Example.

8660

8976 | 71492079806 4 (7

00000

62832

Secondly, I cancell the first cypher to the left hand, and place one cypher more towards the right hand, under the 0, and then I point againe to the first cypher, and see how oft I may haue 8 in 86; I find 9 times, and placing

placing 9 in the Quotient, by it I multiply 8976 my Diuisor, placing the lowest figure in value under the lowest cipher to the right hand, and the rest in order, and I find the product to bee 80784, which taken from 86600, leaves 5816 remaining, and then your worke will stand, as in this

Example.

```
   581
  86600
 ------
8976 |7249207980 64 (79
     00000
 ------
   628324
    8078
```

Thirdly, I cancell my Diuisor, or one Cypher, and place one Cypher more under 7, and then seeke how oft I may haue 8 in 58, which I find 6 times, and by it I multiply my Diuisor 8976 makes 53856, which taken from 58167, leaues 4311, and the worke will stand as followeth.

Example

Example.

43
5821
866061

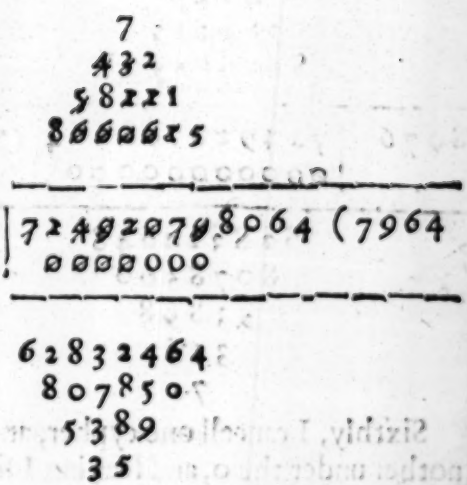
8976 | 72492798064 (796
000000

628324 6
80785
538

Fourthly, I cancell one Cypher, and place a Cypher under 9, and then seeke how oft I may have 8 in 43, which I find but 4 times, which I place in the Quotient, and by it I multiply my Divisor 8976, makes 35904, which taken from 43119, leaves 7215.

Example

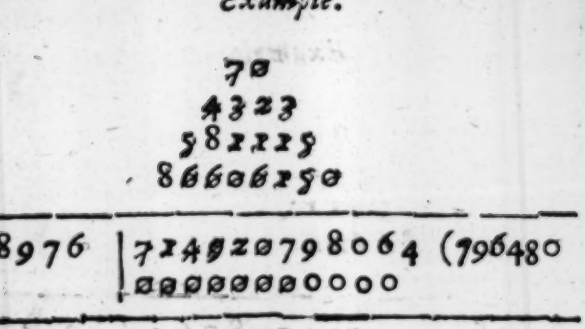
Example.



Fifthly, I cancell one cypher, and place a cypher under 8, and seek how oft 8 is in 72; I find 8 times, which placed in the Quotient, I multiply my Divisor 8976 by it makes 71808, which taken from 72158, leaves 350, and the worke stands, as in the example following.

Example

Example.



Sixthly, I cancell one cypher, and place another under the 0, and seeking I find I cannot haue 8 in 3; therefore I place a 0 in the Quotient. Seventhly, I cancell one cypher, and place one other under the 6, and seeke how oft I may haue 8 in 35; I find but 3 times, and placing 3 in the Quotient, by it I multiply 8976, makes 26928, which taken from 35006, leaues remaining 8078.

Lastly, I cancell the next cypher, and doe place another under the last figure of my Dividend 4, and seeke how oft I may haue 8 in 80; I find 9 times, and then placing 9 in the

the Quotient, I multiply my Diuisor 8976, and the Quotient is 80784, equall unto the numbers above, and so being subtracted from the numbers above, leaues 0 remaining, and the worke is ended, and will stand thus.

Example.

```
                    70
                  43238
                598122150
              866062150 78
-------------------------------------
8976 | 7249207980 64 (79648039
       0000000000000
-------------------------------------
          628324648284
            8078500978
              5389860
                35128
                   7
-------------------------------------
The proofe. 71492079806 4
-------------------------------------
```

The proofe of this Diuision is made by Addition of the figures, under the line or Dividend,

Dividend, for if they returne your former Dividend, the worke is true wrought; or otherwise be sure some error is in your work, if there remaines any fraction after your worke is ended, then it is to bee added into the lower figures in their severall places, as shall appeare by examples following.

Example.

2 2 2
2 2 7 4 7 6
2 4 6 2 2 5 4 2 2 2

Divisor.		*The Quotient.*
1798	1 4 3 9 8 1 9 8 9 6 7 9 4	(8 0 0 7 8 9 7 0 9
	0 0 0 0 0 0 0 0 0 0 0 0	

1 4 3 8 4
1 2 5 8 6
1 4 3 8 4
1 6 1 8 2
1 2 5 8 6
1 6 1 8 2

The pr. 1 4 3 9 8 1 9 8 9 6 7 9 4 *by Addi.*

Heere

Here in this example working according to this latter forme of worke, there is advantage to bee taken; if the figures of the Quotient be well noted, as here the fourth figure of the Quotient is 7, the Product of the Diuiſor multiplyed by it is 12586, and alſo the ſeventh figure of the Quotient is 7, ſo that comming to multiply the Diuiſor againe by that 7, I need but take the Product of the firſt multiplication by 7, which is 12586, and ſo place them in their ſeverall places as in the example, and ſo likewiſe there is 8 in the Quotient two times, ſo that for the latter multiplication, I take the firſt product 14384, and ſave that labour of multiplication of the Diuiſor by 8: and ſo of any other figure comming into the Quotient more times then once, as by the examples will appeare.

Example.

Example.

775
45549
4244628
218268737

7583	876593204 (115599
	00000000

7583
7583
37915
37915
68247
68247

The 876593204 *Proofe.*

Example.

Example.

356 | 7856792 (22069
    | 0000000

---

71 22064
71 130
232

7856792

How to divide by a Vnite with Cyphers.

If you will divide by 10, or by 100, or 1000, or with any other unite with cyphers, one or more; doe but cut off so many figures from the right hand of your Dividend, as there are cyphers in your Divisor, and the remaines is your Quotient.

Example.

If you would divide 786589 by 10, cut off the last figure 9, and the residue is your Quotient 78658 $\frac{9}{10}$; or if you will divide by 100, cut off two figures, and the Quotient

ent will bee 7865 $\frac{32}{100}$; or by 1000, and the quotient will bee 786 $\frac{586}{1000}$; and so of all other.

First.		*Second.*		*Third.*	
78658	9	7865	89	786	586
1 0		1 00		100	0
78658	$\frac{2}{10}$	7865	$\frac{32}{100}$	786	$\frac{586}{1000}$

If you will divide the Product of 1999 squared; that is to say, multiplied in it selfe, which is 3996001 by 1999, for expedition of worke, after you have found the first figure of the quotient 1, and taken that out, I find the next figure will bee 9, which taken out, the third and fourth figures are also found to bee 9, and so you need not make multiplication for every severall 9, but the first will serve for all, as in the example following.

Example.

Division.

Example.

x7
x979
x997999

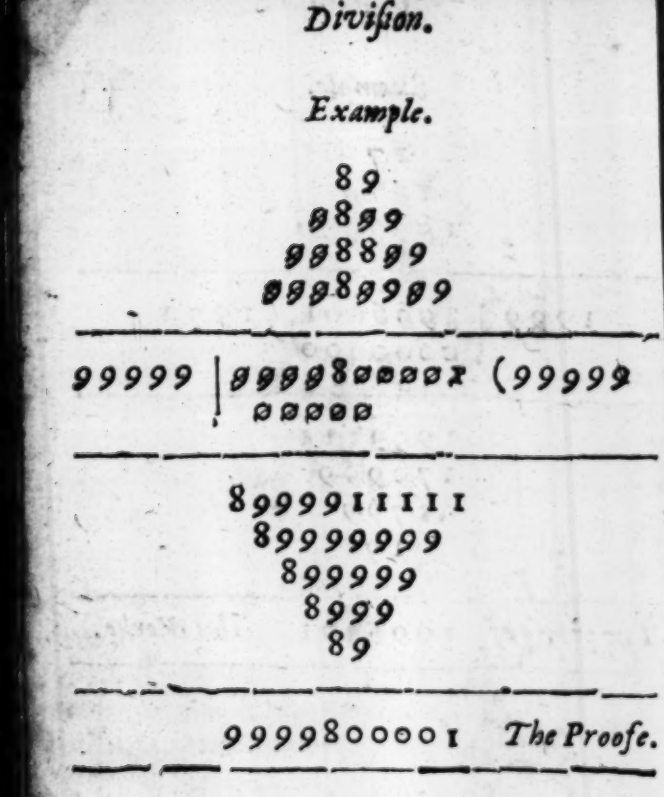
1999 | 3996001 (1999
0000000

1999111
179999
1799
17

The proofe of 3996001 *this Worke.*

Example.

Example.



The Proofe.

Briefe Rules by Multiplication and Diviſion.

If you multiply any number of nines: as if you will multiply, or ſquare 5 times 9 by 5 times 9, then place your nines in this order following.

Example.

Example.

9999900000
99999

9999800001

Then say, 9 times 9 is 81, place the 1 under the first 9 to the right hand, and then subtract the 1 from the first 9 to the left hand, and adde the Cyphers betweene, and the product is ended, and is 9999800001, as appeareth.

The proofe of the worke after the ordinary way.

99999
99999

899991
899991
899991
899991
899991
899991

The proofe. 9999800001

To Multiply any number by 9.

Adde a o to the number you intend to multiply, and then ſet the ſame numbers vnder them, and ſubtract them from the vppermoſt, and the remaines is the Product of that multiplication by 9.

Example.

87987960
8798796

The Product. 791891164

To Multiply by $\frac{1}{2}$, or $\frac{1}{3}$, or $\frac{1}{4}$, or $\frac{1}{5}$.

If you will multiply 856 by 24 $\frac{1}{2}$. firſt, multiply 856 by 24, makes 20544, and then for one halfe, take halfe 856, which is 428, and adde into the former ſumme, makes the totall 20972.

Example.

Example.

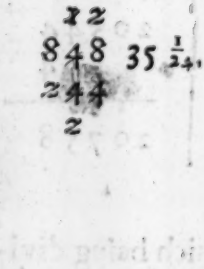
856	856	856
24 1/5	24 1/3	24 1/4
3424	20544	20544
17128	285 1/3	214
42	20829 1/3	20758
20972		

What number is that, which being divided by 24, the quotient will bee 856. Answer, multiply 856 by 24, makes 20544 for the number that you seeke.

Example.

856
24
3424
1712
20544

There is a plot of land containing 848 Perches, the one side is 24, what must the other be. Answere, Divide 848 by 24, the Quotient is $35\frac{1}{3}$ for the other side.



$$\begin{array}{r} 35\frac{1}{3} \\ 24 \\ \hline 140 \\ 708 \\ \hline 848 \end{array}$$

If you will diuide the Product of 5 times 9 squared, which is 9999800001, by 5 nines, then set the Diuisor right underneath the Dividend, and adde them together, and cut off the 5 cyphers from the Product, and the residue is the Quotient.

Example.

9999800001
99999

The Quotient. 99999 | 00000

What

What number is that, which being multiplyed by 15, the totall will be 756. Anſw. divide 756 by 15, and the Quotient is 50 $\frac{6}{15}$ or $\frac{2}{5}$, for the anſwer, or number you do ſeeke.

Example.

756 (50 $\frac{6}{15}$	15 50 $\frac{2}{5}$
255	15
1	250
	506
	756

There are 825 men, to march 15 in one ranke, how many files will they make. Devide 825 by 15, it makes 55 files.

Example.

7	55
825 (55 *files.*	15
255	275
2	55
	825

There is 948 pound of powder to be imployed in an Aſſault of Battery with 6 pieces of Ordinance; the firſt piece ſhooteth 4 pound, the ſecond 5, the third 6, the fourth 7, the fifth 8, the ſixth 10 pound, the queſtion is, how many ſhootes each piece may make, to make an equall number of Shotts. Anſwere. Firſt, find how many pounds of powder all thoſe pieces of Ordinance doe ſpend, in making each of them one ſhott: which by adding together the number of pounds that each ſeverall peece ſpendeth will bee found to bee 40: Then divide 948 by 40, and it makes 23 Shootes, and there will remaine 28 pound.

Example.

4			23
5	22	*Shootes.*	40
6	948	(23.	
7	440		920
8			28
10			
40			948

THE

THE RVLE OF REDVCTION.

TO reduce any great number into a ſmaller denomination it is done by multiplication, and to reduce ſmall denominations into greater it is done by diviſion: in this manner marke how many of the ſmaller denominations is contained in one of the next greater, and by that number you muſt multiply the greater: or of the contrary, if you would bring ſmall denominations into greater, marke how many of the ſmaller denominations makes one of the next greater, and that number ſhall bee your Diviſor.

Example.

If you would reduce pounds ſtarling into pence, multiply your pounds by 24

pence, becauſe ſo many pence maketh pound ſtarling, and the totall will be the number of pence in the ſumme of pounds given. And contrariwiſe, if you would bring pence into pounds ſtarling: divide your number of pence by 240 pence, which are the pence in one pound, and the Quotient will ſhew the number of pounds, in the ſumme of pence given, but in this operation the Tables in the beginning of this booke wil helpe much, for the ſpeedy reducing of pounds, ſhillings pence, yards, ells, buſhels, pecks, pints, &c. into ſmaller or greater denominations: for if you ſearch in the ſaid Tables, you ſhall find your multiplier, or divider, whereby you are to multiply, or divide your number given, to performe the worke, as ſhall appeare by the ſeverall examples following.

Reduction of Coyne.

In 87652 pound, how many pence: in the Table of Coyne I find 240 pence makes one pound, ſo that in multiplying 87652 pound by 240, makes the ſumme of pence deſired.

1 *Example.*

1 *Example.*

87652
240
———
3506080
175304
———
21036480 *d.*

21
2852
2444440
2222
———
21036480 (87652

l.

2 *Example.*

In 3759 pound, 17 ſhillings, 8 pence, how many ſhillings, pence, and farthings.

l.		
3759	q.	
20	388	
	72744	l.
75180	3609488	(3759
17	966660	
	888	
75197 s.		
12	q.	
	3	
150402	362 s.	d.
75197	848 (17.	32 (8
	488	4
902372 d.	4	
4		
		l. s. d.
3609488 q.	Proofe.	3756. 17. 8.

3 Example.

In 3785437289 farthings, how many pounds, ſhillings, and pence: divide by 960 farthings, becauſe 960 farthings makes one pound ſtarling, & the remainer is farthings, which divided by 48, the farthings in one ſhilling, make 3943163 pound, 16 ſhillings 10 pence, $\frac{1}{4}$.

Example.

Example.

432638		
80205260		*li.*
37894372 89	(3943163	
966666660		20
999999		
	78863276	*s.*
9.		12
4		
321 *s. d.*	157726562	
809(16. 10¼	78863276	
488		
4	946359322	*pence.*
		4

The proofe. 37854372 89

How

How to bring pounds, ſhillings, and pence at the firſt worke by Diviſion.

To bring pence at the firſt worke into pounds, ſhillings, and pence: adde a 0 to your number of pence, and divide that ſum by 240, makes pounds, and the laſt figure will bee primes, every unite in value 2 ſhillings, and the remainer alwaies leſſe then 24 pence, or one prime.

Example.

In 902372 pence, how many pounds, ſhillings, and pence; adde a 0, makes 9023720, which divided by 240 pence, makes &c.

```
12  2 d.  20 d.
184220          l.   s.   d.
9023720 (3759.  8. or 17.  8.
2444440
 2222            l.   s.   d.
              3759.  17.  8.
```

2 *Example.*

2 Example.

In 75 000 83 75 04 pence, how many pounds, ſhillings, and pence: adde a cypher, or 0.

```
  1    2220
 3620112340                    l.  r
750008375040 (312503489.  6
244444444440
 222222222
```

How to bring farthings into pounds, ſhillings and pence at the firſt worke.

To bring farthings into pounds, ſhillings and pence at one worke: adde a 0 to your number of farthings, and divide the ſumme by 960, the number of farthings in one pound ſterling, makes pounds; and the laſt figure of your Quotient will bee primes every one in value 2 ſhillings: and if there remaine 48, it is one ſhilling, or take 48 from the remainer for one ſhilling, the reſt are farthings leſſe then 48.

Example

Example.

l. s. d. q.

In 756. 13. 2. 2. how many farthings.

20

15133 *s.*

12

181598 *d.*

4

726394 *q.*

665 *q.*

54638 *l.* 1

7263940 (756. 6

966660

999

l. s. q. s. d. ob.

Totall is 756. 12. 58. or 13. 2. 1.

In 3785437248 farthings, how many pounds, shillings, and pence, adde a 0, and divide by 960, makes 2943163 pound, 8 primes, or 16 shillings, 0 pence.

43263370

90109266 0 *l.* 1

37854372480 (3943163. 8

966666666

9999999

How

How to bring pence into pounds, ſhillings, and pence another way.

Divide your number of pence by 4, and the remainer is pence, then that Quotient by 6, and the remainer is groats, alwayes leſſe then 5 groates, or one prime, or 2 ſhillings; & the latter Quotient, cutting off your Primes, is pounds, and ſo you have pounds, ſhillings, and pence.

Example.

In 785697 pence, how many pounds, ſhillings, and pence, makes 3273 pound, 4 ſhillings, 9 pence.

3 2 7 6 1 1 *d.*	1 4 2 4 2 *groats.*	*l.* ſ.
7 8 5 6 9 7	(1 9 6 4 2 4	(3 2 7 3 | 7
4 4 4 4 4 4	6 6 6 6	

If you will bring farthings into pounds, ſhillings, and pence: divide firſt by 16, and the remainer is farthings, alwaies leſſe then 16, or one groate; and then againe by 6, makes pounds, ſhillings, and pence, as before, cutting off the prime line.

Example.

Example.

In 8735672 farthings, how many pounds shillings, and pence.

Farthings.

x x	*Groats.*	
92258	533	*l.*
8735672 (	545979 (	9092 16
x666666	66066	
xxxxx		

The totall is 9099 l. 13 s. 2 d.

Reduction of Waights.

In 8756 hundred, 3 quarters, 24 pound, 12 ounces Haberdepoyce, 16 ounces to the pound, and 112 pound to the hundred, how many pounds and ounces.

Example.

Example.

C.	*quart.*	*l.*	*ounces.*
8756.	3.	24.	12.
112		$\frac{28}{84}$	$\frac{84}{1792}$
			980780
			16
17512			
87568			5884680
87560			980780
1			12

980780 *pounds* *ounces.* 15692492

In 1569,492 ounces Haberdepoyſe, how many hundreds, quarters, pounds, and ounces; finde how many ounces makes 112 pound, in multiplying 112 pound by 16 ounces, makes 1792 ounces; by which divide, makes, as in the example following.

Example

Example.

2 1 7
2 0 2 4
2 3 8 6 0 4 0 C. 2 1 2 *l. oun.*
2 5 6 9 2 4 9 2 (8 7 5 6 2 7 4 0 (1 0 8 1
2 7 9 2 2 2 2 6 6 8
2 7 9 9 9 2 2
2 7 7
2

	C.	*qu.*	*l.*	*oun.*
The proofe.	6753.	3.	24.	12.

Reduction of Measures.

In 2356 Acres, 3 Roodes, 27 Perches, how many Perches in all.

Example.

Example.

2356
160

x1 *Per. rood.*

1483 60 594 *acres.* 2
2356 47 377107 (2356 247 (3
1 166660 40
111
377107

	Acres.	*Perches.*	*Roodes.*
The Proofe.	2356.	3	27

In 765437 Perches, how many Acres, Roodes, and Perches: divide by 160.

Example.

x x
2365 *Acres.* 3 *roods.* *perch.*
765437 (4783 x57 (3 37
166660 40
111

Reduction

Reduction of time.

In 356 yeares, 24 dayes, 36 houres, and 22 minuts; how many dayes, houres and minuts.

Example.

356
365

1780
21364
10682

129964 *dayes.*
24

519856
259928
3

3119172 *Houres.*
60

187150320
22 *Minutes.*

Totall of 187150342 *Minutes.*

The

The Proofe.

In 187150342 minuts, how many houres, dayes, yeares, and minutes.

Example.

Minutes.	*Houres.*	
	2221	
15121	733536	*Dayes.*
187150342	(3121272	(129964
66666660	2444444	
	22222	

Dayes.	
222	
2041	*Yeares.*
129964	(356
36553	
366	

	Yeares.	*Dayes.*	*Houres.*	*Minutes.*
The proofe is	356	24	36	22

Reduction of Motion.

In 11 Signes, 34 degrees, 25 minutes, 36 seconds, 24 thirds; how many fourths.

Example.

Sign.	*Degr.*	*Min.*	*Sec.*	*Thirds.*	
11.	34.	25.	36.	24	11 *Sig*
					30
				364 *Deg.*	
				60	330 *deg*
					34
				21840 *Min.*	
				25	364
Minuts				21865	
				60	
Seconds				1311900	
				36	
Seconds				1311936	
				60	
				78716160	
				24	
Thirds				78716184	
				60	
Fourths.				4722971040	*Product totall*

The

The proofe.

In 472971040 fourths, how many signes, degrees, minutes, seconds, thirds, & fourths.

Example.

Fourths.	*Thirds.*	
540323232	1 152332	*Seconds.*
472297104 0	(78716184	(1311936
666666660	66666 0	

Seconds.	*Minuts.*	
153336	332	*Degrees.*
131153360	(21865	(364
66666 0	6660	

Degrees. Signes. Deg. Minut. Seconds. Thirds.

364 (12. 4. 25. 56. 24.
330 *The proofe.*

Questions by Reduction.

1. *Question.*

In 389 pound Starling, how many Dollars of 4 shillings 8 pence, or 14 grontes a piece:

piece. Reduce 389 pound into groats, in multiplying them by 60, makes 23340 groats: which divide by 14 groats, makes 1667 pound, and 8 pence.

Example.

Groats.

l.	*s*	*l.*	*s.*	*d.*
389	60	1667.	0.	8.
60				
23340				

2 Question.

In 300 pound ſtarling, how many Angels at a 11 ſhillings a piece. Reduce 300 pound into ſhillings, makes 6000 ſhillings; which divide by 11, makes 545 angels, and there will remaine 5 ſhillings.

Example

Example.

l.	*s.*			
300	365	*angels.*	*s.*	
20	6000	(545.	5.	*Reſt.*
	xxxx			
6000	xx			

3 *Queſtion.*

In 3012 pound, how many Ryals of plate at 7 pence a Ryall. Reduce 3012 pound into pence, makes 722880 pence; which divided by 7, makes, as in the example.

l.	*Example.*		
3012			
240	*Pence.*		
	2464	*Ryalls.*	*d.*
120480	722880	(103268.	4.
6024	777777		
722880	*Pence.*		

4 *Queſtion.*

If one Dollar be worth 4 ſhillings 8 pence,

how many Dollars is in 108579 pound, 16 shillings starling. Multiply your pounds by 60, makes 6514740; then reduce 16 shillings into groates by 3, makes 48 groates; which added into one totall, makes 6514788 which divided by 14, makes, as in the example.

Example.

Pounds.		*Shillings.*
108579		16
60		3
6514740		
48		48
Groats. 6514788		
970520	*Dollars.*	
6514788	(465342	
2444444		
22222		

In 465342 Dollars of 14 groats a piece, how much starling money: multiply your Dollars by 14, makes 6514788 groates; which divide by 60, makes 108579 pound, 16 shillings.

Example.

Example.

465342			
14	*Groats.*		
	3454	*l.*	*s.*
1861368	69124788	(108579.	16
465342	6666660		
6514788			

5. Queſtions.

If I receiue 8060 French Crownes at 6 ſhillings a piece in France, how much Starling muſt I pay for them at 6 ſhillings, 1 penny a piece: multiply 8060 by 73 pence, the number of pence in one French crowne, makes 588380 pence: which diuided by 240 pence, makes 2451 pound, 11 ſhillings, 8 pence.

Example.

8060
73

24180
56420

588280

x

10214
588280
244440
222

Pound.
(2451

Pence.
28
---
140 (11. 8.
222
2.

6 Question.

If 564 yards of cloth coſt 124 pound, 12 ſhillings, how may I ſell a yard to gaine 22 pound, 7 ſhillings, by the whole Summe. Anſwere, adde 22 pound, 7 ſhillings, to 124 pound, 12 ſhillings, makes 146 pound 19 ſhillings: which reduce into pence, makes 35268 pence: which divided by 564, makes 5 *s.* 2 *d.* $\frac{4}{47}$ of a farthing for the price to ſell one yard, for to gaine 22 pound 7 ſhillings by the bargaine.

Example.

Example.

l.	*s.*
124.	12.
22.	7.
176.	19.

l	*s.*
146.	19
	20
2939	
	12
5878	
2939	
35268	

3
80
2820 *d.*
35268 (62. 12.
564
56

7 Question.

If 156 ells of cloth coſt 124 pound, what will one ell coſt. Reduce 124 pound into ſhillings, makes 2480 ſhillings; which divide by 156, makes 15 ſhillings, 4 pence &c. 9.

Example.

```
                1
  124    2924      s.
   20    2480  (15  440/496 of a shilling.
  ----   ----
         0440
         2480
```

8. Question.

If I sell 342 yards of Velvet for 241 pound, 17 shillings, how doe I sell one yard: reduce your 241 pound, 17 shillings, into shillings, makes 4837 shillings; which divided by 342 yards, makes 14 shillings, 1 penny, $^{41}/_{171}$ of a penny.

Example.

l.	*s.*				
241.	17		4		49
20			1219 *s.*		12
4837			4837 (14 $\frac{42}{49}$		98
			3422		49
			34		588

246 *d.*
588 (1 $\frac{41}{97}$ of a penny, makes 14. 1. $\frac{41}{97}$ *d.*
342

s. d.

9 *Question.*

A certaine Nobleman sent his servant to the Tower of London, with the Kings Majesties Warrant to the Mint-master for 3408 pound, 15 shillings, willing him to bring it in pieces of 12 *d.* of 9 *d.* of 6 *d.* of 3 *d.* of 2 *d.* of 1 *d.* of 1 *ob.* commanding him to bring him of each sort a like quantity, or number of pieces; the question is to know, how many of each sort hee shall bring unto his master, to make the said sum of 3408 *li.* 15 *s.* reduce your money into half pence, and also your severall pieces of Coyne into halfe

pence, and divide the greater by the leſſer, as in the example.

Example.

l.	s.
3408	15
	20
68175	
	24
272700	
136350	
1636200	

	d.
22	9
29846 *Pieces.*	6
1636200 (24420$\frac{22}{29846}$	3
677777	2
6666	1 ob.
	67

What

What Progression Arithmeticall is, and the Rule.

PRogression Arithmeticall is nothing else but a briefe summing, collecting, or gathering together of divers numbers, increasing by equall proportion, into one totall summe. As for example: 1,2,3,4,5,6,7,8,9, 10, &c. or also, 2,4,5,6,7,8, &c. or, 2,4,6,8, 10,12, &c. or else by 3,22, 5,8, 11, 14, 17, 20, 23, 26, &c. or of all such like kinds of Progression, which doe increase equally by 2, 3, 4, 5, or 6, or any other greater increase, and such kind of Progression is called, Arithmeticall.

2. *To finde the summe of a Progression.*

Marke first how many severall places there be in your Progression, and note that downe; then adde the first number of the Progression to the last: then multiply halfe those two numbers by the whole number of the places, or else halfe the number of the

places, by the whole number of the firſt and laſt terme added into one ſumme, and both waies will produce the totall ſumme of that Progreſſion.

Example.

There is a Progreſſion beginning at 4, and is continued unto 44, increaſing by 4. Firſt, ſet downe the numbers of that Progreſſion, beginning at 4, and ending at 44.

Termes.	4.	8.	12.	16.	20	24.	28.	32.	36.	40.	44.
Places.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.

Heere the firſt terme is 4, and the laſt terme is 44, which added together, makes 48, the one halfe, which is 24, multiplied by 11, the whole number of places makes 264 the totall.

Example.

Example.

44		44
4		4
48	481	48
11	52	11
48	240	44
48	24	11
258	264	22
264		264

First Question.

A certaine man gave to his daughter in marriage the first day of January 1 pound, and the second day 2 pound, the third day 3 pound, and so increasing every day 1 pound, until 31 dayes were expired; the question is, what he should receive in the whole sum. First, 31 dayes is the number of places, and 31 *li.* is the last payment: adde the 1 terme 1 to the last terme 31, makes 32; which multiplyed by 15 one halfe, which is halfe 31; or take

take 31 and halfe 32, and the product will be the totall Summe of his wives portion.

Example.

32
15 1/2

480
16

496

31
16

186 makes 496 *totall.*

31

496

l.

How to finde the latter terme of a Progression.

If you would know the latter terme of a Progression of 100 termes, increasing by 3, and beginning at 10; take one terme from 100 termes, and there wil remaine 99, which multiply by 3, the excesse or difference of the increase, makes 297; to the which if you adde the first terme 10, makes 307 for the 100 terme of that Progression.

Example

2 Example.

100 *termes.*	99 *termes.*
1 *Subtract.*	3 *Excesse.*
99	297
	10 *first terme.*
	307

Or otherwise take the Excesse 3 from the first terme 10, and there will rest 7, which note apart, then multiply, the number of places 100 by the excesse 3, makes 300; to which adde the 7, makes 307, as before.

Example.

10	103
3	3
7	307

Second Question.

A certaine Merchant bought 78 pieces of Exeter Carsies, to pay 2 shillings for the first

first piece 4 shillings, for the second 6 shilling, for the third, 8 s. and so forth increasing his price unto 78 pieces, 2 shillings in every piece; the question is, what the Clothier had for his Carseys.

First, find the latter terme, taking one from 78, makes 77; which multiply by 2, makes 154; to which adde the first terme 2, makes 156 for the 78, or last terme: then adde 2, the first terme, to 156, the last, makes 158; which multiply by 39, half of the number of places, makes 6162 shillings for the summe of money, the Clothier shall receive for his 78 Carseys.

Example.

78		156
1		2
77		158
2		39
156 *the last terme.*		1422
		474
		6162 *s.*
		or 308 *l.* 2 *s.*

To

To find the number of termes.

There is a Progression, whose first terme is 2, the last terme, 156, and the excesse was 2, I would find the number of termes.

Subtract the first terme from the last, and divide the remayner by the excesse, the quotient is the number of termes, wanting but one. Example: 2, the first terme from 156, the last leaves 154; which divided by 2, makes 77; to which adde 1, makes 78, the number of termes.

	2		
156	2	54	(77
2	2	2	1 *The number of*
			Termes.
154		78	

How to find the Excesse, or difference.

Subtract the first terme from the last, and divide the remainer by one lesse, then the number of the Termes, and the Quotient will be the Excesse or difference.

Example:

Example.

Subtract 10, the firſt terme, from 307 the laſt terme, there will remaine 297; which divide by 99, one leſſe then the number of termes, which are 100, makes 3 the exceſſe.

307 — 10 — 297

00 — 297 (3 *the Exceſſe.* — 99

To find any middle terme.

Subtract a unite from the number of the terme you would know, and multiply the remainer by the difference, and to that product adde the firſt terme, and the totall is the terme you doe ſeeke.

Example.

To finde the 30 terme in the laſt example of 100 termes, ſubtract 1, reſts 29; which multiply by 3, the Exceſſe makes 87; to which adde the firſt terme 10, makes 97 for the 30 terme of that Progreſſion.

Example.

Example.

3	1	10	11	40	21	70
1	2	13	12	43	22	73
	3	16	13	46	23	76
2 9	4	19	14	49	24	79
3	5	22	15	52	25	82
	6	25	16	55	26	85
8 7	7	28	17	58	27	88
1 0	8	31	18	61	28	91
	9	34	19	64	29	94
9 7	10	37	20	67	30	97

How to find what number shall begin and finish a Progression.

To the number of termes add one, which multiply by halfe the number of termes, and by the product divide the summe of the progression, and the quotient will bee the first terme, and excesse of that progression.

Example.

Example.

At 16 payments 353 pound, 12 ſhillings is to be paid, the queſtion is, what number muſt begin, and continue the progreſſion.

Firſt, the money 7072 ſhillings; then to 16, the number of termes, adde 1, makes 17; which multiply by 8, halfe the number of termes, makes 136 for Diviſor; by which divide 7072, and the quotient is 52 ſhillings for the firſt payment and exceſſe, and by the ſame the other payments are found.

Example.

l.	s.		s.	
353.	12	2		17
20		7072 (52		8
7072		272		136
		272		

Example.

Example.

	Nu.			*nu.*
52	1	*The Proofe.*	468	9
104	2		520	10
156	3	1872	572	11
208	4	5200	624	12
260	5		676	13
312	6	7072 *s.*	728	14
364	7		780	15
416	8		832	16
1872			5200	

Of Continuall proportion, or Geometricall Progression.

TWo termes being given to find out a third in continuall proportion.

Divide the Quadrat, or Square of the second terme by the first terme, and the quotient shalbe the third proportionall number or terme sought for.

Example.

Let 8 and 12 bee the two termes given, unto which it is required to find a 3 terme or number in continuall proportion.

The

The quadrat or square of the second terme 12 is 144, which being divided by the first terme 8, the quotient will bee 18 for the third proportionall, or terme required.

To find a Meane proportionall betweene any two numbers, or extreames given.

Multiply the extreames given the one by the other: then extract the square root of the Product for the meane proportionall sought for.

Example.

Let 4 and 9 bee the two numbers or extreames given, and let it be required to find a Meane, or middle proportionall betweene them. Multiply 4 by 9, the Product will be 39, the square root whereof is 6, which is the meane proportionall betweene 4 and 9 the extreames given.

Betweene 2 and 54, let 2 meane proportionals be desired by the square of 2, which is 4; multiply 54, it makes 216, the Cube roote whereof is 6 for the least of the two Meanes:

Meanes: Againe, by 2 multiply 2916, which is the ſquare of 54, makes 5832, of which the Cube roote is 18, for the greater meane proportionall ſought.

To find any middle Terme, or any other Terme in a Geometricall Progreſſion.

Increaſe your Progreſſion by the exceſſe, and the ſquare of the terme when you ceaſe, or the number multiplied in it ſelfe ſquarely, is the double of your Terme ſave 1, if the progreſſion begin with an vnite.

But if the firſt terme be not an vnite, then the ſquare of any terme is the double number of the ſaid terme: as if you ſhould ſquare the ſixth terme, then the Product would be the 12 terme: and ſo of any other terme.

Example.

A Gentleman comming into a Market to buy a Horſe, was asked 30 pounds for him. Nay (ſaid the Gentleman) his price is over great. Then ſaid the owner (having more craft and ſubtilty then the Gentleman, as commonly the old Proverbe is true amongſt Horſe-courſers); My Gelding hath fower ſhooes upon his fower feet (quoth he,) you ſhall give me for the firſt nayle (there being

28 in all) one farthing, and for the second nayle 2 farthings, and for the third 4 farthings, and for the fourth 8 farthings; and so double at every nayle, you shall have him. Whereat the Gentleman smiled, saying; I will have him. And so they bargained, and then went to an Arithmetician to cast up the sum: but how this Gentleman was able to pay for this Horse, shall appeare by the Worke, which I have put for an example, because I would not have any man ignorant in Arithmetick, to make any such blind matches without advice, as I know many have done to their cost.

1 Example.

Now according to the rule, I increase this Progression unto the 7 Terme thus, 1, 2, 4, 8, 16, 32, 64; which 64 I multiply by it selfe squarely, the Product is 4096, which by the rule is the 13 Terme, which is 1 Terme lesse then the double of 7: then multiply that 4096 by 2, it makes 8192, which is the 14 Terme. Then multiply 8192 by 8192, and the Product is 67.08864, which is the 27 Terme: the which being doubled, makes the last Terme 134217728.

Example.

Example.

64
64
256
384
4096
2
8192

8192
8192
16384
73728
8192
65536
67108864
2
134217728

The Extreames and Excesse of a Progression given to find the summe.

Multiply the last terme by the Excesse, and from the Product abate the first Terme, and divide the remayner by a Vnite lesse then the excesse, and the Quotient is the summe of the Progression desired.

Example.

Example.

¶ In the laſt examples, the exceſſe was 2, by which I multiply 134217728, and the Product is 268435456, from which abate 1, the firſt terme, and the remayner is 268435455, which ſhould bee divided by one unite leſſe then the exceſſe, which is 2, and 1 leſſe is but 1; therefore ſeeing 1 doth neither multiply, nor divide, I conclude the price of the horſe to bee 268435455 farthings; which I divide by 960, the farthings in one pound ſtarling, and the quotient is 279620 pound, 5 ſhillings, 3 pence, 3 farthings, the price of the Horſe, as in this example.

Example.

Example.

134217728
2

268435456
1 *farthing.*

268435455

Farthings.

951

762939263 *l.* *s.*

268435455 0 (279620. 2.

666666660

999999

	l.	*s.*	*d.*	*q.*
Total.	279620.	5.	3.	3.

I haue inserted in the next page the triall of this work, by increasing the Termes from 1 to 28, and also the Addition of the totall, which shewes the answere to be true.

Example.

1	1
2	2
4	3
8	4
16	5
32	6
64	7
128	8
256	9
512	10
1024	11
2048	12
4096	13
8192	14
16384	15
32768	16
65536	17
131072	18
262144	19
524288	20
1048576	21
2097152	22
4194304	23
8388608	24
16777216	25
33554432	26
67108864	27
134217728	28
268435455	*The totall*

Otherwiſe, ſubtract the firſt terme from the laſt, and divide the remayner by one acceſſe then the Exceſſe, and to the Quotient adde the laſt Terme, and the totall is the ſumme.

Example.

To 12 men a ſumme of money is given to the eldeſt $\frac{1}{2}$, to the ſecond $\frac{1}{2}$, the remayner, and ſo to every one of the reſt, and the laſt portion was found to bee 4 pound, and the laſt halfe being alſo 4 pound, was given to a friend to ſee the money to bee equally diſtributed; what was each mans portion, and the ſumme given?

Let 4 bee the laſt portion, and twelfth Terme, and ſo double untill you come to the firſt Terme, and you ſhall find every mans portion. Then by this ſecond rule, you ſhall find the totall to be 16380 pound; to which adde the Executors part 4 pound, makes 16384 pound.

3 *Example.*

A Gentleman bought a Mannor, whith all the appurtenances for a ſumme of money unknowne, but hee was to pay at five all

Example.

1	1
2	2
4	3
8	4
16	5
32	6
64	7
128	8
256	9
512	10
1024	11
2048	12
4096	13
8192	14
16384	15
32768	16
65536	17
131072	18
262144	19
524288	20
1048576	21
2097152	22
4194304	23
8388608	24
16777216	25
33554432	26
67108864	27
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268435455	*The totall*

Otherwiſe, ſubtract the firſt terme from the laſt, and divide the remayner by one aceſſe then the Exceſſe, and to the Quotient adde the laſt Terme, and the totall is the ſumme.

Example.

To 12 men a ſumme of money is given to the eldeſt $\frac{1}{2}$, to the ſecond $\frac{1}{3}$, the remayner, and ſo to every one of the reſt, and the laſt portion was found to bee 4 pound, and the laſt halfe being alſo 4 pound, was given to a friend to ſee the money to bee equally diſtributed; what was each mans portion, and the ſumme given?

Let 4 bee the laſt portion, and twelfth Terme, and ſo double untill you come to the firſt Terme, and you ſhall find every mans portion. Then by this ſecond rule, you ſhall find the totall to be 16380 pound; to which adde the Executors part 4 pound, makes 16384 pound.

3 *Example.*

A Gentleman bought a Mannor, whith all the appurtenances for a ſumme of money unknowne, but hee was to pay at ſixe all

payes of payment, by continuall triplation, of every payment, from the first payment which was 4 pound, and the last 8748 *li.* the question is, what he paid for the said Mannor and lands.

Example.

Subtract the first terme 4, from the last terme 8748, there will remaine 8744; which divide by the Excesse, one lesse, *viz.* by 2, and the quotient will bee 4372; to the which adde the latter terme 8748, and the totall is 13120 pound, for the summe which the said Mannor and lands cost.

8748 — 4 — 8744

8744 (4372
2222
8748

13120

YOu ſhall underſtand, that in the work of Fractions hereafter; in the next page following I have uſed another forme of working, then heretofore hath been uſed: as when you will ſet fooorth any fraction, as $\frac{3}{4}$ thus heretofore uſed, ſet them out thus, 3: 4: or $\frac{7}{8}$, place thus 7. 8 with a double prick betweene them: and ſo of any other, as $\frac{15}{20}$ of a pound, thus, 15; 20 of one pound; or fractions of fractions, thus, $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$ of a pound, ſet them thus, 2: 3 of 3: 4 of 5: 6 of a pound; and ſo of all other fractions, as ſhall appeare afterward in the operations following; and ſo being placed, they are more apter and fitter for all the ſeverall operations of Arithmetick, then being placed after the ordinary forme of working. And thus much I thought good to expreſſe for the better underſtanding of the Rules hereafter following, in all fractionall operations. And now I will proceed unto the ſeverall rules of Fractions, with their Examples.

How to reduce Fractions of Fractions.

First Rule.

Multiply their Numerators one into another for a new numerator, and likewise their Denominators for a new denominator, and the worke is ended.

Example.

If you would reduce 3:4 of 2:3 of 7:8 of one *li.* starling; multiply 3 by 2, makes 6, and then 6 by 7 makes 42 for the new numerator to your fraction: then 4 by 3 makes 12, and 12 by 8 makes 96 for new denominator, And the fraction is 42:96 of a pound.

3:4 of 2:3 of 7:8 of 1 *li.* makes 42:96 of a *li.*

2 Example.

Againe, 3:5 of 9:8 of 7:10 of 11:12 of a pound, makes 2079:4800.

3 *Example.*

3
9

27
7

189
11

189
189

2079

8
5

40
10

400
12

4800

3 *Example.*

What is 1:2 of 2:3 of 3:4 of 4:5 of 5:6 of 6:7 of one pound. Answer: crosse al the by:s equall termes, and set the unequall termes 1:7 of a pound for the totall summe: but after the other forme of worke, it would have brought out 720:5040 of a pound, which by abbreviation makes 1:7

The Proofe.

72:504, 36:252, 18:126, 9:63, 3:21, 1:7.

2. *Rule: How to reduce Fractions of Integers.*

Multiply all the Denominators of your severall fractions for the new, or common Denominator to all your given fractions.

Then to find new Numerators to each of your given fractions; multiply each fractions numerator into the denominators, of each severall fraction, excepting his owne denominator, for the new numerators, as in this example.

Example.

If you would reduce 3: 4 and 5:6 and 7:8 of a pound into one Denomination: multiply all the denominators together, saying 4 by 6 makes 24 and 24 by 8 makes 192 for the common Denominator to all the given Fractions.

Then multiply 3, the Numerator of the first fraction, by 6, the Denominator of the second fraction, makes 18, & 18 by 8 makes 144 for his numerator.

Secondly, multiply 5, the numerator of the second fraction by 4 and 8, the Denominators of the other 2 fractions, makes 160 for the new Numerator of the second fraction.

Thirdly,

Thirdly, multiply 7, the numerator of the third fraction, by 6 and 4, makes 168.

Example.

	N. D.	18	20	42	144
144.	3:4	8	8	4	160
160.	5:6				168
168.	7:8	144	160	168	
					472
	192	*The totall,* 472: 192.			

2 Example.

If you would reduce 2:3, and 3:5, and 8:9 of a pound.

N. D. *N. D.*

90. 2:3 7:10 126

81. 3:5 Also, 10:15 150

120. 8:9 21:13 168

95 Pence is 95 parts now put up-

& 5 *Example.*

3 Example.

If you would reduce 7:8, 1:3, 2:3, 4:5, and 6:7 of a pound.

	N.D.				
2205.	7:8				
840.	1:3	40.	1:2		40
1680.	2:3	70.	7:8		70
2016.	4:5	48.	3:5		48
2160.	6.7				
			80		158
2520.					

How to proove a Fraction by the knowne parts of Coyne.

In the first example of fractions of fractions, I find that 3:4 of 2:3 of 7:8 of a pound Sterling to bee 42:96 parts of a pound: for triall whereof, take 7:8 of a pound, which is 17 shillings 6 pence, or 210 pence, the 2:3 of that number is 140 pence; and 3:4 of 140 pence is 105 pence: now multiply 42 the numerator of your fraction by 240 *d.* and divide by 96, the Denominator, makes 105 pence, the proofe, as followeth.

4 Example.

4 Example.

2 Example.

In the first Example of Fracti us of integers, there was 3:4, 5:6 and 7:8 of a pound, reduced into one denomination, and the totall by Addition was 472 192 of a pound. Now for the proofe of the worke, multiply the numerator 472 by 240, makes 113280; which

which divided by 192 the denominator, makes 590 pence; which divided by 12 pence, makes 2 pound, 9 shillings, 2 pence. The proofe of this triall in the parts of a pound, take first for 3:4 of a pound, or 15 shillings; then 5:6 of a pound is 16 shillings 8 pence; also 7: 8 of a pound is 17 shillings 6 pence; and the totall added together, is 2 pound, 9 shillings, 2 pence, which prooves the worke to be true.

Example.

472			0	
340			7720	
18880		113280		(590
944			7922	
113280			78	

d.		15.	0
222	s. d.	16.	8
590 (49	2.	17.	6
222			
78		2.	9. 2

3 Rule.

3 *Rule. Addition in Fractions.*

If your fractions be of one denomination, then adde all your numerators together, subscribing the common denominator under the line.

Example.

2 : 4	3 : 12	5 : 8
5 : 4	8 : 12	1 7 : 8
3 : 4	1 1 : 12	1 3 : 8
7 : 4	2 2 : 12	6 : 8
17 : 4		

The second Rule.

If your fractions be not of one denomination, then reduce them by the second rule of Reduction to one denomination, and then adde them into one sum subscribing under the common denominator.

Example.

Example.

40	2:3	1440	24:12	
45	3:4	836	13:10	
48	4:5	2040	17: 6	
133	60	4316	720	

If you would add 40:80, 30:200, and 50:90; cut off a Cypher from each numerator and Denominator, and the Fractions remaining will be of the same with the given fractions, and then worke as before.

Example.

720	48	48	30:44	
216	3:20	192	60:20	
800	5:9	56	7080	
1736	1440	296	64	

The proofe of Addition by parts of Coyne.

In the second Example, 2:3, 3:4, and 4:5 of a pound, are found to be 133. 60; therfore divide 133 by 60, makes 2 pound and 13:60 or 13 groats remaining, which is 2 pound, 4 shillings, 4 pence.

The proofe: adde 2:3 of a pound, which is 13 shillings, 4 pence; and 3:4 of a pound, which is 15 shillings, and 4:5 of a pound, which is 16 shillings, into one totall, makes 2 pound, 4 shillings, 4 pence, as before.

Example.

Groat.				*l.*	*s.*	*d.*
1	*l.*	*s.*	*d.*	13	4	
233	(2	4	4	15	0	
60				16	0	
				l.		
				2.	4	4

4 Rule.

Rule 4. Subtraction in fractions.

As before in Addition, so also in subtraction, reduce your fractions to one common denomination, then subtract the smaller numerator from the greater, and subscribe the common denominator under the remainer.

1 Example.

If you will subtract 3:4 from 7:4, there will remaine 4:4, or one integer.

Also, 7:12 from 13:12, leaves 6:12, or 1:2 remaining. But if you will subtract 2:3 from 7:8, then reduce them to one denomination, by the second rule of Reduction, and worke, as in this example.

Example.

3:4	7:12	16	2:3
7:4	13:12	21	7:8
4:4	6:12		5:24

2 Example.

2 Example.

Againe, 3:8 from 15:16, leaves 72 : 128, remaines.

120	15:16
48	3: 8
72:	128

The proofe of Subtraction by the parts of Coyne.

In the example before, where I take 2: 3 from 7:8, the remayner was 5:24 of a pound, which is 5 times 10 pence, or 4 ſhillings 2 pence. Alſo for proofe, take 13 ſhillings 4 pence, which is 2 : 3 of a pound, from 7:8, which is 5 ſhillings 6 pence, there will remaine 4 ſhillings 2 pence, as before.

5 Rule. Multiplication in Fractions.

Multiply Numerator by Numerator, and Denominator by Denominator, to make the new Numerator, and new Denominator, and the worke is ended.

1 Example.

1 *Example.*

If you will multiply 2:3, by 3:4, the product of that multiplication will bee 6:12, or 1:2

6	15	2520
2 : 3	5 : 7	35 : 60
3 : 4	3 : 4	72 : 120
12	28	7200 or 252:720

The proof of Multiplication by the parts of Coyne.

In the first example, 2:3 is multiplyed by 3:4, and the product makes 6:12 of a pound or 10 shillings: for proofe wherof multiply 13 shillings 4 pence, or 160 pence, which is 2:3 of a pound by 15 shillings, or 180 pence, which is 3:4 of a pound, and the Product will be 28800, which being divided by 240 pence, the pence in one pound will yeeld in the quotient 120 pence, or 10 shillings.

Example.

Example.

s.	*d.*				
13	4	15		180	
12		12		160	
26		30		10800	
134		15		180	
160		180		28800	

	d.	*s.*
28800	(120	220(10
24440		222
22		2

6 Rule. Division in Fractions.

Multiply the Numerator of the Dividend by the denominator of the divisor for a new Numerator; and secondly the Denominator of the dividend by the Numerator of the divisor, for new denominator, and the division is ended: or otherwise place your dividend first above, and the divisor underneath, after any manner, and multiply crosse, and place them as in these examples.

If

If you wil divide 6:12 by 2:3, which w the product of 2 : 3 by 3:4 in the last exam ple, then it will bring out 18: 24, or 3:4, th other number, which prooves the work good.

1 Example.

18	10	360
6:12	2:3	12:15
2:3	4:5	16:20
24	12	240

If the Denominators of the fractions bee both alike, then divide their numerators one by another; as 27 : 32 divided by 3: 32, makes the quotient to be 9 : 32.

Example.

9	3	3
27:32	9:8	21:12
3:32	3:8	7:12
32	8	12

If the Numerators be alike, then set the denominator of the Divisor above, the Denominator

inator of the dividend, as 3 : 4 by 3 : 8, makes the quotient 8 : 4, or two integers, and contrariwise 3:8 by 3:4, makes the quotient 4:8, or 1:2.

Example.

8	4	24
3:4	3:8	7:16
3:8	3:4	7:24
4	8	16

The proofe of Division by the parts of Coyne.

In the second of the first example, where I divide 2 : 3 by 4 : 5, the quotient is 10: 12, which in coyne is 16 shillings 8 pence: for proofe, I do multiply 2 : 3 of a pound, which is 163 pence, by 240, makes 38400; which divide by 4 : 5, or 192 pence, makes 200 pence, which is 16 shillings 8 pence, the proofe.

Example.

	s.	d.		s.	
2:3	13	4	4:5	16	
	12			12	
	160			192	

160
240
6400
320
38400

d.		d.		
38400	(200	88	s.	d.
38400		200	(16	8
399		112		
1		1		

7 Rule. How to worke whole numbers with Fractions.

If you would Adde, Subtract, Multiply, or divide whole numbers with fractions, set the whole numbers fraction wise, and put 1 after for denominator, and then worke as in the Rules before, as if they were all Fractions, and no whole numbers.

Example.

Example.

If you will adde 33:1 with 13:4, multiply the Numerator 33 of your whole number, by the Denominator of your Fraction 4, makes 132:4, which adde unto 13:4, makes the totall 145:4

132	33:1		896	128:1	
Ad. 13	13:4		36	36:7	
145 :	4		932 :	7	

2 *Example.*

If you will subtract 13:4 from 33:1, reduce them, and Subtract 13 from 132, rest 119:4

132	33:1		896	128:1	
Sub. 13	13:4		36	36:7	
119 :	4		860 :	7	

3 *Example.*

Example.

If you will multiply 33: 1 by 13:4; multiply the numerators, 33 by 13, makes 429; to the which subscribe the Denominator 4, makes 429: 4

33 : 1	128 : 1
13 : 4	36 : 7
492 : 4	4608 : 7

4 *Example.*

If you will divide 33: 1 by 13:4, multiply crosse 33 by 4, makes 132, to be set above; then 13 by 1 makes 13 for denominator.

132	108	866
33 : 1	27 : 1	128 : 1
13 : 4	32 : 4	36 : 7
13	32	36

8 *Rule.*

8 *Rule. How to worke whole numbers and Fractions with Fractions.*

Reduce your whole numbers into Fractions in multiplying your whole number by the Denominator of your Fraction; and unto that product adde the Numerator of your Fraction, and subscribe the old denominator.

1 *Example.*

If you will multiply 28 3:4 by 3:5 reduce 28 3:4 into fourths in multiplying by the Fractions Denominator 4, saying, 28 by 4 makes 112, to the which adde the Numerator of your Fraction 3, makes 115; which multiplied by 3:5, makes 345:20

28 3:4 — 115:4

4 — 3:5

115 : 4 — 345:20

If you will divide 28 3:4 by 3:5; reduce them as before, and then multiply them crosse, makes 115:4 by 3:5 is 575:12

Example.

5 7 5
2 2 5 : 4
3 : 5

1 2

3 *Rule. How to Abbreviate a Fraction.*

Take one halfe of the Numerator, and 1:2 of the Denominator, as oft as you may untill the loweſt numbers in valew of your fractions comes to be primes together, which are ſuch numbers, as cannot bee abbreviated no lower.

Example.

In the firſt example of fractions of fractions, the fraction was 72:504, which was abbreviated unto 1:7 of a pound: firſt, take halfe the Numerator 72, which is 36, then halfe the Denominator 504, which is 252; then 1:2 of 36, is 18; and 1:2 of 252 is 126. Againe, 1:2 of 18 is 9, and 1:2 of 126 is 63; then I ſee I cannot take 1:2 of the remainer, where-

wherefore I see I may abbreviate them by 3 till, saying, the third part of 9 is 3, and 1:3 of 63 is 21 : lastly, 1:3 of 3 is 1, and 1:3 of 21 is 7, which place thus, 1:7 ; so that I find by abbreviation that 72:504 of a pound, is one seventh part of a pound.

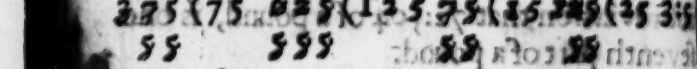
Example.

72:504 36:252 18:126 9 63 3:21 1:7

If you cannot take halfe the numbers, then marke whether they will abbreviate by 3, 4, or 5, or any other number under 9; as for example, I would abbreviate 92:144, I see I may abbreviate both by 4; then taking 92, divide by 4, makes 23, and 144 by 4 makes 36, totall 23:36, &c.

If you will abreviate, 375:625 of a pound, you may easily see, they will be both abreviated by 5: wherefore divide the Numerator and Denominator both by 5, as oft as you can, untill they become primes together, and you shall find the value of that fraction to be 3:5 of one pound, or 12 shillings.

Example.



10 *Rule. How to find the value of any Fraction.*

Multiply the Numerator of your fraction by the parts contained in the whole, and divide that Product by the old Denominator, and the Quotient will bee the value of that fraction in the knowne parts of Coyne.

Example.

If you would know what 24:32 parts of a pound is in Coyne: multiply your Numerator 24 by 240, the pence in one pound, makes 5760; which divided by 32, the denominator, makes 180 pence, or 15 shillings, the true value of that fraction.

Example.

24					
240	29	*d.*	6	*s.*	
	5760	(180	180	(15	
960	2222		122		
48	22		2		
5760					

What is 343:522 parts of a yard, multiply 343 by 16, the number of nayles in one yard makes 5448; which divide by 522, makes 10 nayles, and 268:522 parts of a nayle.

Example.

343	16	*Nayles.*	
16	5488	(10	268:522
	5220		
5488	52		

11 *Rule. How to change the Sirname of a Fraction.*

Multiply the Numerator of your Fraction by the parts, or new Sirname of that you would change your fraction into, and divide

by your denominator, and the quotient will be your desire.

1. Example.

I have 324:1620 parts of a yeere, which I would convert into dayes; I multiply 324 by 365, the number of dayes in one yeare, makes 118260; which divided by 1620, makes 73 dayes, the value of that fraction.

Example.

324		
365		
1620	118260	(73
1944	113400	
972	4860	
118260		

I would change 256:5292 parts of a pound into pence; multiply the Numerator 256 by 240 pence, makes 61440, which divide by the denominator 5292, and the quotient is 34 pence 1512:5292

Example.

Example.

```
 756
 240        151
------    -------
           22682      d.
30240     2721440   (34, 1512:5292
1512       529 22
------    -------
           529 8
181440
```

12 *Rule.* *Questions of Fractions.*

What number is that to the which if you doe adde 3:4, the Totall will bee 5:6 of a pound. Answere; reduce them to one Denomination, and they are for 3:4 of a pound 18:24, and the 5:6 are 20:24, from which subtract 18, rest 2:24 of a pound, or 20 pence: the proofe, take 3:4 of a pound, which is 15 shillings, and adde 20 pence to it, and the Totall is 16 shillings, 8 pence; which is 5:6 of a pound.

Example.

N.	*D:*	*s.*	*d.*
18	3:4	15	0
20	5:6	1	8
2	24	16	8

2 *Example.*

What number is that, from which if you doe Subtract 8:12, the remayner will bee 6:10, Answere, reduce them, and adde them both into one Totall, makes 152:120 of a pound for the number you doe seeke.

The proofe in coyne; 152:120 of a pound is 304 pence, and 8:12 of a pound is 160 pence, which taken from 304, leaves 144 pence remaining, which is 6:10 of a pound, or 12 shillings, as appeareth by the worke.

80	8	12	152	304	*z*	*s.*
72	6	10	*a*	160	144	(12
					222	
152		120	304	144	*z*	

What

What number is that, which being multiplyed by 3:5, the Product will bee 9:20. Answere divide 9:20 by 3 5, and the Quotient is 45:60, or 3:4. For the proofe, multiply 108 pence, which is 9:10 of a pound, by 240, the product is 25920; which divide by 144, or 3:5, which is 12 shillings, makes 180 pence, or 3:4 of a pound.

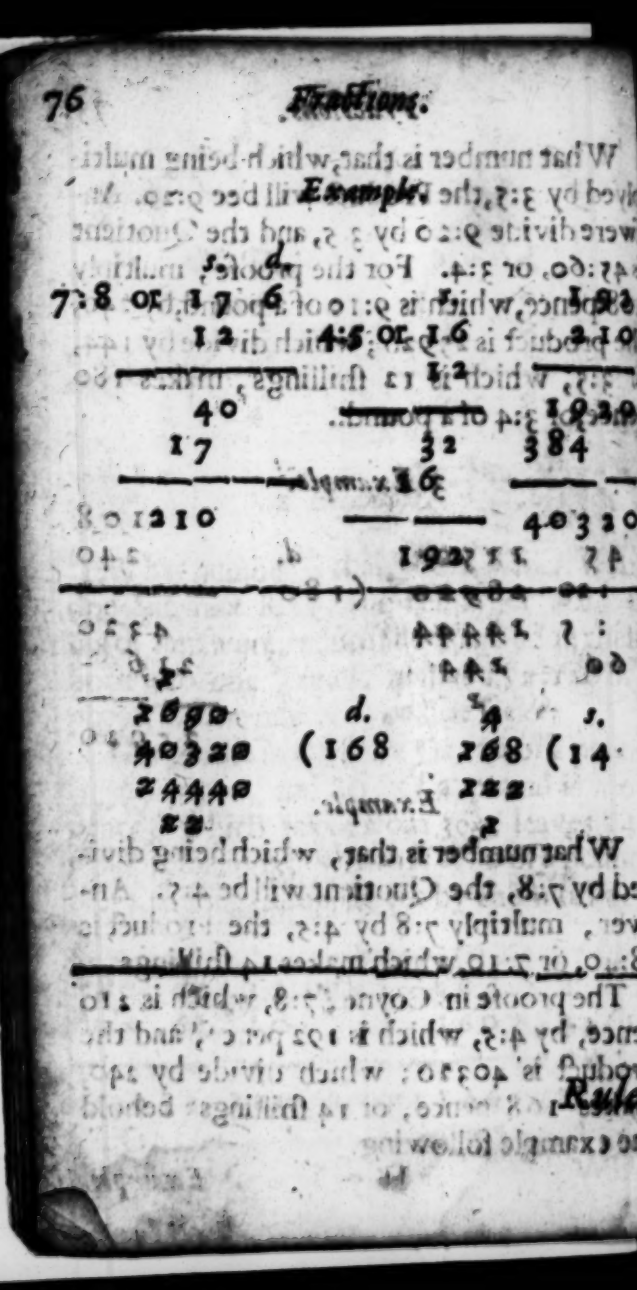
3 Example.

45 | 25920 | d. | 240
9 : 20 | 28920 | (180 | 43 20
3 : 5 | 24444 | | 216
60 | 244 | |

Example.

What number is that, which being divided by 7:8, the Quotient will be 4:5. Answer, multiply 7:8 by 4:5, the Product is 28:40, or 7:10, which makes 14 shillings.

The proofe in Coyne; 7:8, which is 210 pence, by 4:5, which is 192 pence, and the Product is 40320; which divide by 240, makes 168 pence, or 14 shillings: behold the example following.



Rules of Practice.

Rules of Practice by the first Table.

TO worke by the Aliquot parts of a pound, search in the first Table for your given price, and by that number found, divide your number given, and the quotient is your answere in pounds, and the remayner is the fraction of one pound.

But if the given price be not found exactly at the first entrance, then find 2, or more numbers, to make the given price, and then worke as followeth.

Example.

If one yard cost 3 shillings 4 pence, what will 7859 yards cost at that rate: I enter the Table, and against 3 shillings 4 pence, I find 1:6 of a pound, wherefore I divide 7859 by 6, makes 1309 pound, 5:6 of one pound, or 16 shillings 8 pence.

20	5	l.		s.	d.
7859	(1309	5:6	or	16	8
6					

The

The first Table.

The second Table.

The Aliquot parts of a pound.

Shillings.

s.	*d*	*par.*	*s.*	*d.*	*par.*	*s.*	*par.*	*s.*	*par.*
	1	240		1.4	15	1	1/2	11	5.½
	2	120		1.8	12	2	1/10	12	6.
	3	80		2.0	10	3	1/20	13	6.½
	4	60		2.6	8	4	1/30	14	7.
	5	48		3.4	6	5	1/40	15	7.½
	6	40		4.0	5	6	1/60	16	8.
	8	30		5.0	4	7	1/80	17	8.½
	10	24		6.8	3	8	1/120	18	9.
1.	0	20		10.0	2	9	1/240	19	9.½
1.	3	16		20.0	1	10		20	10

Divisors. *Multipliers.*

At 16 pence an ell, what will 8976 elles cost, I find for 16 pence my Divisor to be 15, and so dividing 8976 by 15 the quotient is 598 pound, 6:15, or 2:5, which is 8 shillings.

Example.

Example.

```
2
242      l.
8976 (5 9 8  6:15, or 2:5 is 8
2555
 22
```

Adde a Cypher to your number given, and the laſt figure of your quotient will bee primes, every one in value 2 ſhillings, and the remayner is the Fraction of a Prime, alwayes leſſe then 2 ſhillings. In the firſt example, the remayner was 5:6 of one pound, but if you add a Cypher, the Quotient will be 1309 pound, 8 primes or 16 ſhillings, and the remayner is 2:6 of one prime, or 1:3, which is 8 pence.

At 2 shillings 6 pence a pound pepper, what will 2436 pound cost: find 2 shillings, 6 pence 1:8 of a pound, wherefore adde a Cypher, and divide, by 8, makes 304 pound, 10 shillings.

4 *l.* 1 *s*

24360 (304 5 or 10.
8888

At 8 pence a pound Ginger, will 77856 pound cost; divide by 30, adding a Cypher, makes 2595 pound, 2 primes, or 4 shillings.

l. *s.*

778560 (25952 or 4
6666666

At 17 pence a pound Sugar; what shall 23459 pounds cost: for 12 pence, divide by 20, makes 1172 pound, 9 primes, 1:2 or 19 shillings: then for the rest of your given price, which is 5 pence; take 48, and divide, and the quotient is 488 pound, 7 primes, which added together into one sum, makes the totall 1661 pound, 13 shillings, 7 pence.

Example.

2 2 1 l. s. d.
2 3 4 5 9 0 (1 1 7 2 9 1 : 3
2 2 2 2 2 0

4 3 1
4 2 2 5 4 l. s
2 3 4 5 9 0 (4 8 8 7 7 : 2 4
4 8 8 8 8
4 4 4

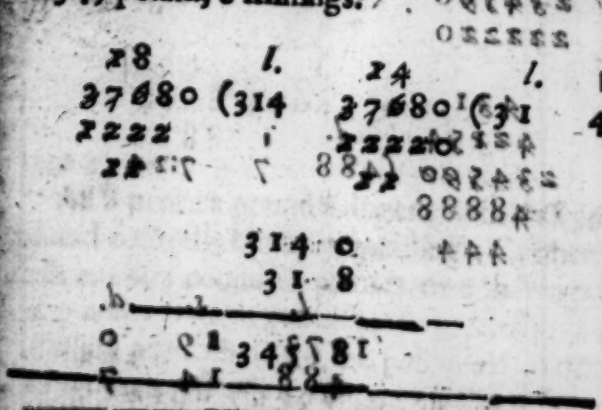
	l.	s.	d.
	1 1 7 2	9	0
	4 8 8	14	7
The Summe.	1661	13	7

At 6 shillings 8 pence a pound Cloves, what will 3769 pound waight cost: divide by 3, makes 1256 pound, 3 primes, 1 : 3, or 6 shillings 8 pence.

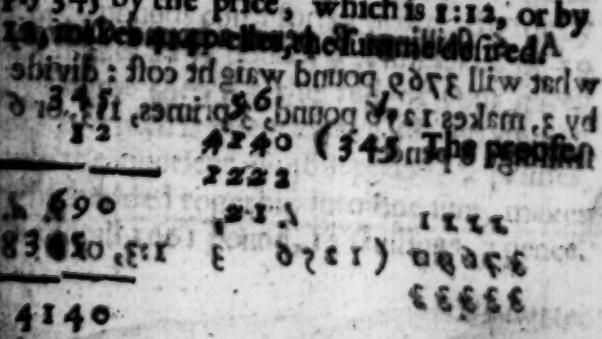
2 2 2 1 l. s. d.
3 7 6 9 0 (1 2 5 6 3 1 : 3, or 6 8
3 3 3 3 3

At

At 22 pence an elle of Holland, what 3768 elles coſt: for 20 pence divide by 12 makes 314 pound, and for 2 pence by 120, makes 31 pound, 4 primes, or 8 ſhillings; the totall is 345 pound, 8 ſhillings.



If one elle of Holland coſt 20 pence, how many elles ſhall I buy for 345 pound: multiply 345 by the price, which is 1:12, or by 12, makes 4140 elles, the ſumme deſired.



The practiſe

If

If one ell of Ozenbrigs coſt 8 pence, what ſum of elles will 78 pound buy me: multiply by 30, makes 2340 elles.

78
30
2340 elles.

78
15
390
78
1170

22 elles.
2270 (78
795
2

At 15 pence an elle of Canvas, how many elles will 100 pound buy: multiply by 16, makes 1600 elles.

If one elle of parchment lace coſt 1 penny, how many ells ſhall I have for 73 pound: multiply by 240, makes 17520 ells.

Example.

Example.

240
73

720
1680

17520

7 l.
27520 (73
2440
2

If one Acre of land bee 5 shillings, how many Acres may I hire for 132 pound: multiply by 4, makes 528 Acres.

132
4
---
528 Acres.

The Rules of Practice by the second Table.

If the price given bee any number of shillings, search in the second Table for the price given, and by the number there found: multiply your number of yards, ells, pounds or pieces, and cut off the last figure with a dash

dash of the penne for primes, every one in value 2 shillings, and the Product is the sum of pounds and shillings that your given number will cost.

Example.

At 2 shillings an elle of Holland, what will 956 elles cost: in the second Table I find the tenth of the number given, so that if you take the tenth of 956, it is 95 pound, 12 shillings, onely by cutting off the last figure by a dash of the penne.

956 elles at 2 *s.* an ell, makes 95 | 6, or 12 *s.*

At 7 shillings an ell of Cambricke, what will 789 elles cost: multiply by 3 1:2, or take halfe of the given number, and multiply the whole number given, by 3, makes in one sum, cutting off the prime line, 276 pound, 3 shillings.

Example.

Example.

789
3 1:2

2367
394 1:2

276 1 1:2

Also 1240 ells at 7 *s.* 434 *l.*

1:2

3720
620

434 0

At 25 shillings a piece Rayſons, what will 356 pieces coſt: take alwayes halfe the number of ſhillings of your given price for your multiplyer, and worke as before, and the Product is 456 pound, 0 prime.

Example.

Example.

356
12 1:2

4272
178

4450

Also 75032 pieces at 26 shilling a piece.

75032
13

225096
75032

975416 or 12 *s.*

If one barrell of Sope cost 47 shillings, what will 3584 barrels cost: multiply by 23 1:2, makes 8422 pound, 8 shillings.

Example.

Example:

3584
23 1:2
10752
71682
179

8422 | 4

At 3 pound 6 shillings a Barrell, what will 124 cost.

124
33
372
372

409 | 2

If

If one Acre of land cost 6 pound 8 shillings, what will 758 Acres cost: multiply by 64 shillings, which is halfe the price, the Product is 4851 pound, 4 shillings, or two pence.

758
64

3032
4548

4851 | 2

How to proove the last question, or any other of like kind. If one Acre of land cost 6 pound 8 shillings, how many Acres shall bee bought for 4851 pound, 4 shillings: divide your number of pounds and shillings by one halfe of the number of shillings in the price given, adding a Cypher to your number of pounds, and the Quotient is the number of Acres of land the said summe will buy at that rate.

Examples

Example.

The given sum is 4851 pound, 2 primes, or 4 shillings; which divided by halfe the given price, which is 64 shillings, brings into the Quotient 758 Acres: and so of any other summe.

5
37 *Acres.*
48522 (758
6444
66

A Merchant bought Cambricks, cost him 855 pound, 18 shillings; the Question is, how many pieces hee had, paying for every piece 27 shillings. Answere, adde a Cypher to your number given, which 855 pound, 9 primes, makes 85590; which divide by halfe the price given, which is 13 1:2; or divide by 135 the Quotient will bee 634 pieces: now the reason wherfore a Cypher is added to the number given, having 9 primes in it is, because I divide by 13 1:2, which hath one fraction; and this rule is generall.

Example.

Example.

What coſt 634 pieces, at 27 ſhillings.

634
27

4438 *Pieces.*
1268
17118 (634
1902
1268
634
634
317

The Proofe. 855|9

How to proove one queſtion in the Rules of Practice, by working of another.

If you will proove any Queſtion in the Rules of Practice by a ſecond example marke the complement, or want of your given price from one pound, and worke the ſame number at that price which doth want, and the totall of thoſe 2 ſums added together, makes the juſt number of pounds of the given ſumme.

Example.

At 16 shillings a piece of Fustian, what will 320 pieces cost. Answere; multiply by 8, makes 256 pound, 0 prime.

Againe, 16 shillings your given price wanted 4 shillings of one pound, wherefore worke 320 at 4 shillings, which is multiplyed by 2 primes, makes 64 pound, 0 prime, the totall is 320 pound, which prooves the former worke.

320	320	356
8	2	64
2560	640	320 *pound.*

Example.

At 13 shillings a piece of Lawne, what will 752 pieces cost: 752 by 6 1:2, makes 488 pound, 8 primes.

At 7 shillings a piece, what 752 pieces: 752 by 3 1:2, makes 263 pound, 2 primes, the totall is 752 pound.

Example.

Example.

725			725		
6	1 : 1		3	1 : 2	
4512			2556		
376			376		
48818			26312		

2632
4888

75210

Rules of Practice by the third Table, the most excellent of all the other.

The third Table.

The Aliquot parts of 24.					The parts of a Shillings.			
d.	par.	d.	part.		d	par.	d	part.
1	24.	13	2.	24	4	48	7	2. 11
2	12.	14	3.	4	½	24	8	1. ⅓
3	8.	15	2.	8	⅓	18	9	2. 4
4	6.	16	3.	3	¼	16	10	2. 3
5	12.8	17	3.4.	8	—	—	11	2.3. 6
6	4.	18	2.	4	d.		12	Idem.
7	8.6	19	2.8.	6	1	1		
8	3.	20	2.	3	2	2		
9	4.8	21	2.4.	8	3	3		
10	4.6	22	2.4.	6	4	4		
11	3.8	23	2.3.	8	6	6		
12	2.	24	1.					

The third Table.

Divisors.

Divide

Divide the number of ells, yards, pounds, or pieces given by the number, or numbers found in the third Table, alwaies cutting the last figure for primes; if that any remaine after Division, it is alwaies lesse then 1 prime, or 2 shillings.

Example.

At 3 pence a pound Licoras, what will 123728 pound cost? Answer; for 3 pence in the third Table, I find my Divisor to bee 8, by which I divide my given number, makes 1546 pound, 6 primes, or 12 shillings.

		l.	s.
4 54			
123728	(1546	6	or 12
88888			

At 9 pence the pound Ginger, what will 8768 pound, cost: for 6 pence divided by 4, makes 219 *l.* 2 primes, then for 3 pence the residue of the price, divide by 8, makes 109 pound, 6 primes, totall is 328 pound, 16 shillings. Or otherwise, divide by 4 for 6 *d.* and then take halfe that product for 3 pence, and adde them into one summe, as before.

Example.

3	l.	1	4	l.	
8768	(219	2	8768	(169	8
4444			8888	819	8
				328	8

At 12 pence the yard Canvas, what will 2356 cost: for 8 pence divide by 3, makes 78 pound, 5 primes, 1:3 or 8 pence, and for 3 pence, divide by 8, makes 29 pound, 4 primes, 1:2, or 12 pence; the totall is 107 pound, 19 shillings, 8 pence.

2	1	1	l.	1	d.	7	2	4	l.	1	
2356	(78	5	8			2356	(29	4	1:3		
222						888					

l.	s.	d.
29	9	0
78	10	8
107	19	8

A second

A second example, the proofe of the last.

At 13 pence a pound fine Sugar, what will 2356 pound coſt: for 12 pence divide by 2, makes 117 pound, 8 primes, or 16 ſhillings: then for 1 penny, divide by 24, makes 9 pound, 8 primes, 4 pence, the totall is 127 pound, 12 ſhillings, 4 pence; which added to the former ſum in the laſt example, makes 235 pound, 12 ſhillings; and ſo much will 2356 pound coſt at 2 ſhillings a pound, becauſe the two given prices make one prime, or 2 ſhillings.

Example.

21	l.			294	l.		d.
2356 (117	8	d.		2356 (9	8		4
222	9	8	4	244			
				8			
	127	6	4				
	127	12	4				
	107	19	8				
	235	12	0				

At 16 pence, a pound Sugar, what wi
78432 pound coſt: worke for 8 pence, an
double the ſumme, makes 5228 pound,
primes, or 16 ſhillings.

At 8 pence a pound Almonds, what wi
78432 pound coſt: divide by 3, makes 261
pound, 4 primes, or 8 ſhillings, which adde
with the former example makes 784
pound, 2 primes, which is the price that
78432 pound wil coſt at 3 ſhillings a pound,
and prooves both examples true.

Example.

				l.	
7	8	4	3	2	
3	3	3	3	3	
			5	2	2 8

				l.	
7	8	4	3	2	
3	3	3	3	3	
			7	8	4 3 2

At

Example.

3 4 3 8
7 : 8 2 2 4
2 8 : 1 5 6
7 8 4

1
6 1 6 l.
7 8 4 (3 1 2 : 3 of a pound.
2 4 4
2

If 784 cost 7 : 8 of a pound, what will the whole piece cost, containing 2244 ells, at that rate? Answer.

350
25 : 8 1 l.
5 : 7 2280 (6 18 : 350
57 : 3 180
2280 or 10 s. 7 : 3 of 2 d.

If 12 pound, 4 ounces of Quichanella cost 4 pound, 3 shillings, 4 pence, how much will 100 pound buy me at that rate? If 49:4 of a pound cost 25:6 of a pound sterling, what will 600:6 parts of a pound buy. Answere.

600

If 25:6 of a pound buy 49:4 of a pound, what 600:6 of a pound.

l. 52
176400 (294
66600
175400

The proofe of this last example. If 100 pound starling buy me 294 pound of quichanella, how much shall 4 pound, 3 shillings, 4 pence buy mee? to find the valew of the hundred, the rate of one pound being given; abate 2 places from 294, and it will bee 2 pound 94:100 parts of one pound: which multiply by 4 pound, 12:6, makes 25 pound 25:100 parts, or one fourth for the proofe.

l. 12
2:94
4 1:6
1176

294 (49
66

12 2:5

If

If 30 men cast a Trench in 3 dayes 2:3; how many men would cast it in 5:6 of a day? here by comparing these proportions together, I find that 5:6 the third number, will desire a greater quantity of men to performe the worke, then 11:3 of a day will require; wherefore this proportion is reciprocall or backward; wherefore I multiply the 2 former numbers together, makes 333:3, or in smaller termes, 110.1; which divided by 5:6, makes 660:5; which divide by the Denominator 5, makes 132 men.

330	660	12	Men.
11:30	110:1	660 (132	
30:11	5:6	555	
3	5		

In the Backward Rule, or Converst in fractions, multiply the Denominator of your third number, by the Numerators of both your other numbers for dividend; then multiply the numerator of your third number, by the Denominators of your other 2 numbers for divisor, and then worke as before.

Example.

Example.

1980

If 1 1:3 of a day 4 3 *Men.*
give 3 0:1 men, 3 1980 (132
what 5:6 of a day 3 5 5 3
15 33

If when the Bushell of Wheate was sold for 4 shillings, the penny loafe wavghed 6 ounces 1:2, what shall the same loafe weigh when Wheat is sold for 2 shilling, 8 pence the bushell? Multiply 48 by 13, makes your dividend 624: then 2 by 32, makes 64 for your divisor, and then divide 624 by 64, makes 9 ounces, 48:64, or 3:4 of an ounce.

624

If 48:1 pence 48 *Ounces.*
gives 13:2 ounces 64 624 (9. 3:4
what 32:1 pence. 64.
64.

If when one ounce of sterling silver was worth 1:4 of a pound the penny of silver weighed 30 graines, what shall the same penny weigh, when the ounce shal be worth 1:5 of a pound.

Example.

Example.

90

If 1:4 of a pound 22 *graines.*
give 30:1 graynes, 90 (22 1:3
what 1:3 of a pound. 44
4

If when a loade of Hay was sold for 24 shillings, 8 pence, the penny bottle weighed 3 pound, 1:4, what shall it weigh, now the load is sold 37 shillings. Answer, 3 pound, 71:76 of a pound.

1040

If 80:3 shilling 152 *li.* *li.*
give 13:4 pound 2040 (3 71:76
what 37:1 shillings. 444
444

If 3 yards 1:8 cost 9 shillings, 9 pence, what will 380 yards cost at that rate? Reduce 3 yards 1:8 into eights, makes 25:8; then reduce 380 yards into eights, makes 3040:8 parts: then 9 *l.* 9 *d.* into pence, makes 117 pence; by which multiply 3040, makes 355680, which divided by 25, makes 14227 pence, 5:25 of one penny

in

in the whole 59 pound, 5 ſhillings, 7 pence, 5:25 or 1:5 of a penny. Behold the worke.

yard.		s.	d.	
3	1:8	9	9	380
8		12		8
25		117		3040
				117
				21280
				3040
				3040
				355680

20 20 5 d.
355680 (14227 2/5
255555
2222

1 d.
2 69

l.		d.	s.	d.	
242270 (59.	2.	19.	or 5.	7.	1:5
24440					
22					

The proofe of the former worke. If 380 yards coſt 59 pound, 5 ſhillings, 7 pence 5:25 of one penny, what will 3 yards 1:8 coſt at that rate? reduce your coyne into 25, makes 355680; then reduce your 380 yards into 8, makes 3040; by which di-

vide

dle 144227 pence, makes 9 ſhillings, 9 pence, as before.

144227 | 25
71140 | 5769
28454
355680

5769 | 20
1185 | 288
12
2377
1185
14227

d.
12 | 9 s. d.
(1227 (9 9
12

If 34 ſhip Carpenters build a ſhip in 8 moneths 305, in how long time will 120 Carpenters build the ſame? Reduce 8 moneths 305, into fifths, makes 4345; then multiply 34 by 43, makes 1462. Alſo put your diviſor 120 into fifths, makes 600; then dividing of 1462 by 600, the Quotient will

will bee 2 moneths 462:600 parts of one moneth, or in smallest termes 231:300 parts. And this Rule generall if one of your numbers bee a Fraction, put alwaies your Divisor into the same fraction of your dividend, and the quotient will be of the same denomination of your dividend, and so the answer was moneths, and parts of a moneth.

If 34 Carpenters aske 43:5 moneths, what 60:5 moneth.

34			
43			
102	2	*months.*	*month.*
136	462	(2	231:300
1462	600		
	months.	*dayes.*	*of a day.*
makes	2.	12	68:300

If 100 pound in 12 moneths gaine 10 pound, what will 336 pound gaine in 8 moneths? Take the tenth part of 336, which is 33 li. 6 primes, or 12 s. makes 369 li. 12 s. Secondly, if 12 moneths gaine 33 pound 6 primes, what will 8 moneths gaine? Answere,

Example.

856
95

4280
7704

81320

Pence.

x

81320 (20330
44444

Groats.

45552
20330 (3388
6666

l. *s.* *d.*
1 8 8

At 2 shillings, 11 pence an elle Holland, what will 7856 elles cost: multiply, and divide as is before taught, makes 1145 *li.* 13 shillings, 4 pence.

Example.

Example.

7856
35 *Pence.*
321
39280 274960 (68740
23568 44444
274960

Groats.

2344 *l.* *s.*
68740 (11145 6
66666

At 17 shillings, 7 pence a yard Broad Cloath, what will 7856 yards cost: multiply by 211, the price of one yard, and divide as before, makes 6906 pound, 7 primes.

Example.

Example.

7856
211
---
22 *Groats.*

7856 1657616 (414404
7856 444444
15712

1657616

Groats.

5 42 *l.*
424404 (6906 7
66666

If your given price have any farthings in it, then reduce your price into farthings, and multiply your given number by those farthings, and the product will bee the number of farthings, which your summe will cost; then divide that product by 16, makes the quotient groats, and the remainer will be farthings, alwaies lesse then 16, or one Groate. Secondly, divide that quotient of Groats by 6, makes pounds and primes, as before.

Example.

Example.

At 5 shillings, 1 penny, one halfe-peny ounce Plate, what will 356 ounces cost R duce 5 shillings, 1 penny, half-peny into f things, makes 246 farthings: by which m tiply 356, makes 87567 farthings; whic divided by 16, makes 5473 Groats; and farthings will remaine; which divide agai by 6, makes 91 pound, 2 primes, and 2 Gro will remaine, Totall is 91 pound, 4 shilling 6 pence.

At 6 shillings, 9 pence ¾ farthing an ounc of gilt plate, what will 3542 ounces cost: multiply your shillings by 48, the farthing which are in one shilling, makes 288; to the which adde 37 farthings, which are in 9 pence, farthing, makes 325 farthings, and then worke as before is taught, and you shall find 1199 pound, 2 shillings, 3 pence, halfe penny.

Example.

Example.

3542	*Farthings.*	
325	2 21	
	35714	
17710	2252256	(71946
7084	266666	
10626	2222	
151150		
	2554	*l.* 1
	2266666	(1199 1
	66666	

Another way to worke Practice.

Divide your number of yards, elles, or pieces by 24, adding a Cypher to your number given, and then multiply the Quotient by your price, and the Product is the sum of pounds, and shillings, that the given number will coſt.

At 17 pence the elle Canvas, what will 7848 elles coſt: adde a Cypher, and divide 78480 by 240, and the Quotient will bee 32 pound, 7 primes; which multiply by 17 pence,

pence, the price, makes 555 pound, 9 primes or 18 shillings.

Example.

2	327
66	17
78480	2289
24440	327
22	
	555 19

At 3 shillings, 5 pence an ell of Holland, what will 702 elles cost: divide 7020 by 240, makes 2 pound, 9 primes, and there will remaine 60, which multiply by 41 pence, the price of one ell, makes 118 pound, 9 primes, or 18 shillings, and then the 6 elles, makes 1 pound, 6 pence, the totall is 119 pound, 18 shillings, 6 pence.

Example.

| | | |

The Golden Rule.

Of single proportion Direct, or The Rule of three, called the Golden Rule.

IN this Rule of 3 Direct, there is always three termes given, and a fourth required, and it is called the Golden Rule, in regard of the excellency of this Rule above all others. The difficulty of this Rule consisteth in the right placing of the 3 numbers given, set the terme next your right hand, whereupon the question is moved, and a terme of the same nature towards the left hand, and the third terme in the middle. Then multiply the second number by the third, and divide the Product by the first, and the Quotient is the fourth proportionall number sought or desired to be found out; whose denomination is ever like unto the middle number.

Example.

Example.

If 90 yards of Cloath cost 23 pound, what
ost 346 yards.

23 *l.*
958 (88 38:20 of a *li.*
990

346
23
1038
692
7958

If 124 pound gaine 37 pound, 12 shil-
ngs, what will 758 pound gaine.

37 12
20
752

758
752
116
140
240
355
356
495
570016

1
2281
74052
700216 (4596 112:124
224444
12222
22

How to worke this last example, and all other after a more briefe and exact manner.

Divide the third number by the first, and by the quotient multiply the second, and the product is the answere.

Example.

If 356 elles cost 137 pound, 12 shillings, 9 pence, what cost 2848 elles.

		137	12	9
	0	8		
2848	(8			
356		1096	96	72 (6
		5	6	12
		1101	2	

Totall is 1101 *li.* 2 *s.* 0 *d.*

First, dividing 2848 by 356, the quotient is 8: by which I multiply 137 pound, 12 shillings, 9 pence, the Products are 1096 pound, 96 shillings, 72 pence; then divide 72 by

2 by 12, is 6 shillings; which added to 96 shillings, makes 102 shillings, or 5 pound, 2 shillings; the Totall is 1201 pound, 2 shillings, as before.

2 Example.

If 124 yards cost 17 pound, 10 shillings, 1 penny, what cost 744 yards.

	l.	*s.*	*d.*
	17	10	1
	6		
744 (6			
24	102	60	6
	3		
	105	0	6

If 132 pieces of Rayſons cost 19 pound, 2 shilling, 2 pence, what will 112 pieces cost at that rate.

Example.

l.		
19	2	
3½		
16		
57	1	7
2		
66	17	7

If 356 pieces coſt 137 pound, 12 ſhillings, 9 pence; what will 2848 pieces coſt at that rate.

		33033
		2848
137	12. 9	
20		20224
2752		24404
12		101112
		122202
33033		20224
		24404
		66066
		94077984

Example.

Example.

Example.

How to know whether any queſtion given be to be anſwered by the Rule Direct, or Converſed.

By theſe notes following, you ſhall find whether any queſtion propounded be to bee anſwered by the Rule of 3 Direct, or converſed; for alwaies the third number is the number whereon the queſtion dependeth, and is diſtinguiſhed from the other two, by ſome one of theſe notes following.

How much. *How wide.*
How deepe. *How long.* or ſuch like.
How farre. *What coſt.*

And the anſwer is alwaies, more or leſſe, ſo that if it bee more then the leſſer of your 2 extreame numbers is the diviſor: if leſſe, then the greater of your 2 extreames is your diviſor. If the number wheron the queſtion be depending, bee your Diviſor, then the anſwer is, by the converſe Rule, and you muſt multiply your 2 former numbers for Dividend. If the firſt number bee the Diviſor, then the queſtion is anſwerable by the direct Rule, and the product of the 2 latter numbers is your Dividend.

Example.

Example.

If 13 Cannons ſpend 358 pound of powder, what will 5 Cannons ſpend, now heere the queſtion is, what 5 Cannons will ſpend. ſanſwere, leſſe then 13 Cannons; wherefore by this rule, the greater of the 2 extreames, 13 is the diviſor: wherefore I multiply 358 by 5, and divide by 13, makes 137 pound, 6:13 that 5 Cannons will ſpend.

2 *Example.*

If 13 Cannons ſpend 358 powder, what will 5 Cannons ſpend.

358	*r*		
5	409	*l.*	
1790	2790	(137	9:13
	2333		
	22		

3 *Example.*

I lent my friend 115 pound for 7 moneths, and when I came to him to require the like kindneſſe he could lend me by 54 pound, the

queſtion is, how long hee ſhould forbe
that 54 pound to make requitall, or to equ
my time, and kindneſſe.

If 115 pound require 7 moneths, wh
will 54 pound require: heere the anſwere
reaſon is, that 54 pound muſt be longer tim
forborne then 115 pound, and ſo the anſwe
is more times then 115 pound; ſo that I fin
the leſſer of my extreames 54, is my diviſor
and the queſtion anſwerable by the rule con
verſed, ſo that I multiply 115 by 7, make
805; which divided by 54, makes 1
moneths, 49:54 of a moneth, or 14 moneths
25 dayes, 23:25

Example.

115	4	
7	269	*Moneths.*
805	805	(14 49:51
	544	
	5	
49		
28	2	
392	292	*Dayes.*
98	1372	(25 22:25
1372	544	
	5	

4 *Example.*

4 Example.

A Captaine of a Band of men is beſieged a City having with him 7200 men, and victuals will ſerue the whole Company 7 moneths, but there is no hope left to ve any freſh victuals untill 16 moneths; e queſtion is, how many men he ſhall ſend way to make the victuals ſerue for 16 moeths. Anſwer, leſſe then 7200 men.

If 7 moneths require 7200 men, how many will 16 moneths aske?

7200		
7	28	Men.
50400	50400	(3150
	28	+
	226	
	224	
	2	

When Wheate was ſold at 3 ſhillings, 8 nce the buſhell, the penny loafe of bread ai hed 6 ounces, what ſhall the ſame loafe bread waigh, when Wheat is ſould for 2 illings the buſhell? Anſwer more then ounces.

If 44 pence give 6 ounces, what will 24 pence give.

44	z	*Ounces.*
6	264	(11
	244	
264	z	

If 356 men digge a trench in 24 dayes, in how many dayes will 200 men make the same? Answere, in more dayes; 42 dayes, 7 houres, 7:25.

If 356 men require 24 dayes, how many will 200 men require.

356		
24		
	1	*Dayes.*
1424	8544	(42 144:200
712	2200	
8544:		
	144	
	24	
	z	*Houres*
	576	3456 (17 7:200
	288	2200
	3456	

Or thus; Considering the numbers, 200 may bee had in 156 once, therefore for 200 take 24 dayes; then for 150 take 18 dayes, totall 42 dayes; then there will remaine 6 to bee multiplyed by 24, makes 144:200 parts of a day, as before.

If 112 pound cost 3 pound, 5 shillings, 5 pence, what will 3136 pound cost; divide 3136 by 112, makes 28; which multiply by 3 pound, 5 shillings, 5 pence, makes 91 pound, 11 shillings, 8 pence.

	l.	*s.*	*d.*
	28	28	28
	3	5	5
89			28
3136 (28			240 (11
2122	84	11	222
22	7	140	2
	91	11	8

If 100 pound gaine 7 pound, what summe of money will gaine 85 at that rate? Answere.

If

If 7 pound require 100 pound, what will 85 pound, require.

2232	*l.*	85
8500 (1214 2:7		100
7777		8500

Or otherwise, divide 85 by 7, makes 11 1:7; by which multiply 100, makes 1214 pound 2:7 of a pound.

22		100
85 (12 1:7		12 1:7
77		1214 2:7

Or otherwise, divide 100 by 7, makes 14 1:7; by which multiply 85, makes 1214 pound, 2:7

Example.

Example.

8 5
14 2:7

32
80 (14 2:7
77

340
85
241:7

1214 1:7

Carſeys at 54 ſhillings the piece, are put in Barter, at 3 pound the piece, how ſhall Wooll worth 24 ſhillings the Tod, bee ſet in Barter, to make the bargaine equall?

If 54 ſhillings be 60 ſhillings, what ſhall 24 ſhillings make.

Anſwere: for more then 24 ſhillings, and leſſe then 54, ſo that 54 is the Diviſor; and multiplying 24 by 60, makes 1440; which divided by 54, makes 26 ſhillings, 2:3, or 8 pence.

If 54 ſhillings be 60 ſhillings, what wi
24 ſhillings make.

```
  3                                    2
 366                                   6
2440 (26 36:54, or 2:3, or 8 ——
 344                          1440
  5
```

If 6 ſheepe coſt 58 ſhillings, how many
ſhall I buy for 124 pound? multiply 124
by 58, makes 7192; which divide by 6,
makes 1198 ſheepe 2:3.

```
  124
   58
 ———
  992        2554
  620        7192 (1198 2:3
 ———         6666
 ———
 7192
```

Or otherwiſe, divide 58 by 6, makes 9
2:3, by which multiply 124, makes 1198
2:3, as before.

Example.

Example.

```
                                  124
                                    9  2:3
                                  ------
   4
  58 (9 2:3                      1116
   6                                8  2:3
                                  ------
                                  1198  2:3
```

A Merchant at Sivill delivereth 1500 Rialls, to receive for every 11, being a Ducat in London 5 shillings, 10 pence sterling money, how much must he receive?

If 11 Rialls be 70 pence, what are 1500 Rials?

```
                                  Pence.
                                   11
  474                            2387          l. 1
 1500 (136 4:11                 95450 (39 7
 1111    70                     24440
        -----                     22
         952
          25
        -----                      l.  s.  d.
         9545   Totall is         39  15   5
```

At 13 pound in the 100 pound profit, of what ſtocke came 3274 pound? Anſwer: divide 3274 pound by 113 pound, makes 2897 pound, 39:113 of a pound, adde two cyphers to the given number.

```
  2  83
2020399      l.
327400 (2897  39:113 of a pound.
222333
 2222
  22
```

A Merchant received for principall and gaine 328, wherein he found he had gained cleare 56 pound, what did he gaine upon the 100 pound. Anſwere, multiply 100 by 56, the gaines makes 5600; which divide by 328, and the Quotient is 17 pound, 3:41 in ſmalleſt termes.

```
 100
  56   2324  l.
------
 5600 (17. 24:328, or 3:41 of a li.
 5600  3288
       232
```

If

If 112 pound coſt 7 pound, 6 ſhillings, how may I ſell to gaine 10 pound upon the 100 pound. Anſwere: Take the tenth part of 7 pound, 6 ſhillings, or of 146 ſhillings, which is 14 ſhillings, 3:5 of a ſhilling; which added to the price, makes 8 pound, 7 pence, 1:5 of a penny.

l.	*s.*			*l.*	*s.*	
7	6		*s.*	7	6	
20		*146*	(14 3:5		14	3:5
		220				
146				8	00	7 *d.*

If 100 pound exchange be 7 pound 2 ſhillings, what is one pound. Anſwere, 71:100 parts of a pound: wherefore multiply 71 by 240, and divide by 100, makes 17 pence. 12:5 of a penny.

71			*d.*		*d.*
240		*17040*	(17	40:100	1
2840		*21100*			
142					
17040			71:100		

If

If 107 ells of cloth coſt 17 pound 12 ſhillings, what will 321 elles coſt at that rate? Heere if you conſider the proportion betweene the firſt number, and the third, you ſhal find the third number doth containe the firſt exactly 3 times; wherfore you need not to multiply the ſecond by the third, and divide by the firſt number, but only take the ſecond number, and multiply by 3, makes 52 pound, 16 ſhillings for the price that 321 ells will coſt: behold the worke at large.

If 107 elles of cloth coſt 17 pound, 12 ſhillings, what will 321 elles?

l.	*s.*
17	12
	20
352	

321	
352	
642	
1605	
963	
112992	

364	*s.*	1	*l.* *s.*
112992 (1056		2056 (52	16
207777		220	
20000			
22			

How

How to find whether that your numbers given be proportionall, or not.

Divide your third number by the first, and if the Quotient bee an even number, and nothing remaine of your dividend, then the first and third numbers are even proportionall in whole numbers, as in the last example, the first number was 107, and the third number 321, so that in dividing the third number by the first, the quotient is 3 & 0 remaines: wherefore I conclude, that the first and third numbers are proportionals in whole numbers, and that the third doth containe the first just 3 times, and so often must the fourth number sought for, containe the second; & I conclude, that 3 times 17 pound 12 shillings, which is 52 pound 16 shillings, is the fourth proportionall number sought, as appeareth by the ordinary forme of worke in the last example.

	l.	s.
	17	12
321 (3	3	3
107		
	52	16

If

If 36 elles of cloth coſt 13 pound, 4 ſhillings, 1 penny, what will 432 elles coſt at that rate: divide 432 by 36, makes 12; by which multiply your ſecond number 1 pound, 4 ſhillings, 1 penny, makes 15 pound, 9 ſhillings.

	1	3	4
7	12	12	12
432 (12			
366	28	9	0
72	13		
	15	8	9

A. doth lend unto B. 600 pound for 8 moneths, the queſtion is, how much B. ſhall lend unto A. for 12 moneths to recompence him, not reckoning compound intereſt. Anſwere. If 8 moneths require 600 pound, what will 12 moneths require: the reaſon is leſſe then 600 pound, wherefore divide 600 pound by 12, makes 50; which multiply by 8, makes 400 pound.

Or otherwiſe by proportion, as 8 is to 12 ſo muſt 600 bee to 400 pound, 2:3 parts of 600 pe...

If

If the number bee not exactly proportionall, yet there is a great abbreviation to bee made of the worke of Reduction, Multiplication, and Division, in the working of most examples in the Golden Rule; as for example.

If 19 Barrels of Figgs cost 16 pound 12 shillings, what shall 58 Barrels cost, here dividing 58 by 19, the Quotient is 3, and 1 will remaine; wherefore I take 3 times 16 pound, 12 shillings, for 57 barrels, and I have to worke but for the one remaining; which is but to divide 16 pound, 12 shillings, by 19, makes 17 shillings, 9:19 of one shilling, the Totall is 50 pound, 13 shillings, 9:19 shillings.

l.	*s.*
16	12
3	3
49	16

49	16	9
	17	19
50	13	9:19

If 356 elles of Holland cost 124 pound, 2 shillings, 3 pence, what will 7259 elles cost at that rate. Reduce 124 pound, 2 shillings 3 pence, into pence, makes 29787 pence: which multiply by 7259, makes 216223833 pence,

pence, which divide by 359, make 60737 which divided by 240 pence, makes 25 pound, 170 pence, or 14 shillings 2 pence.

Example.

l.	*s.*	*d.*
1 124	2	3
20		
2482		
12		
4967		
2482		
29787		

29787
7239

64549453
143961136
1116102
48447
14353
0536
181
8

2163238833

356

12591
263202 d.
56 | 216223833 (607370
000000000

213602822
24969
104
2

216223833 *The Proofe.*

12601 l. 92 s. d.
607370 (2530 272 (14 2
244440 222
222 2

A second way more briefly to worke this queſtion, or any other of like nature, is this: multiply the third number by the pounds and primes, or ſhillings and pence, and divide the Product by the firſt number, and the Quotient will bee the fourth number ſought. In the laſt example, 7259 elles was the third number, which multiply by 124 *l.* 1 prime, or 2 *s.* makes 900841 *l.* 9 primes: the

then alſo 7259 by 3 pence, makes 2177 pence; which divided by 240, makes 9 pound, 14 ſhillings, 9 pence; then adde thoſe two ſums into one Totall, makes 900932 primes, 9 pence; leave out 9, and then divide the reſidue by 336, makes 2530 pound 7 primes, and 54:356; which with the 9 brings out the two pence, as in the laſt example.

Example.

7259
1241

7259
29036
14518
7259

900841 | 9 d.
9017 9

900932 | 6

7259

d.	*d.*		
7259	2339	*l.*	1
3	217770 (90		7
	24440		
21777	22		

Primes.

20

1882534		*l.*	1
9009326	(2530		7
3566668			
35559			
333			

If 24 pieces of Rayſons coſt 25 pound, 18 ſhillings, what will 324 pieces coſt: multiply 324 by 25 pound, 4 primes, makes 229, 6 primes: which if you divide by 24, the Quotient will be 342 pound, 9 primes, or 18 ſhillings without Reduction, as in the Example following.

Example.

324			
254			
	2		
1296	10620	l.	1
1620	82296	(342	8
648	24444		
	222	or,	
82296		342 l. 18 s.	

If 25 pound gaine 1 pound, 8 shilling what will 725 pound gaine at that rate Multiply 725 by 1 pound 4 primes, mak 10150.; which divided by 25, makes pound, 6 primes, or 12 shillings.

725			
14		l.	1
	10150	(40	6
2900	2525		
725	22		
10150			

And in this sort may divers other questi-
s bee wrought in pounds and shillings
ithout Reduction, which I thought good
give a taste of, but I will proceed here no
rther, because I purpose in the second part
this Booke to speake of them at large in
e Treatise of *Decimall Arithmetick*, wher-
all manner of questions are to be wrought
Multiplication and Division in pounds,
illings and pence, without Reduction, as
all appeare in their severall places follow-
g. And now I will proceede to speake
mething of the Rule of Three Direct and
onverst in Fractionall operations, wherein
will be as briefe as I may, not intending to
rease this little Treatise intended for a
ocket booke, into over large a volume.

The Rule of 3 in Fractions.

If your 3 numbers given be all Fractions,
ultiply the third by the second, and divide
he Product by the first, and the Quotient
will bee the fourth proportionall number
ought for.

Example.

If 3:4 of a yard of Holland cost 4:5 pound, what shall 5:6 of 1 yard cost at the rate? Multiply 5:6 by 4:5, makes 20:30 or 21:3, which divide by 3:4, makes 8:9 of a pound, or 17 shillings, 7:9 of one shilling.

2 9 8
4 : 5 2 : 3
6 3 : 4
9

If 7:8 of one ell of cloth cost 9:12 of a pound, what will 17 elles cost? Make it fraction wise, and multiply 17:1 by 9:12, makes 153:12, which will be both abbreviated by 3, makes 51:4, which divided by 7, makes 408:28 parts of a pound, or in small termes 102:7; then divide 102 by 7, makes 14 pound, 4:7 of one pound for the price.

153 408
17 : 1 51 : 4 2 8 6 7
9 : 12 7 : 8 2 4 8 (14 4
12 28 28 8
2

2. Rule.

If all your 3 numbers given be Fractions, multiply the Numerator of the first fraction by the denominator of the other 2 fractions, for to make your Divisor. Then multiply the Denominator of your first Fraction by the Numerators of your other 2 Fractions, to make your Dividend and then divide by your Divisor, and the quotient is the answer sought: but if your Divisor be greater then your Dividend, then the Quotient is a fraction, lesse then a unite.

Example.

If 3:4 of a yard cost 4:5 of a pound, what cost 5:6 of a yard? Multiply 3, the Numerator of the first Fraction by 5 and 6, the denominators of the other two fractions, makes 90 for your divisor; then multiply 4, the Denominator of your first Fraction by 4 and 5, the Numerators of your other two fractions, makes 80 for your dividend: now because your Divisor is greater then your Dividend, place them Fraction wise thus, 80:90 of 1 *li.* or in least termes, 8:9 of a *li.*

Example.

If 3 : 4 of a yard
coſt 4 : 5 of a pound } make 8 :
what 5 : 6 of a yard

Againe, if 7 : 8 of an ell coſt 3 : 3 of a ſhilling, what will 34 ells coſt.

21

If 7 : 8 of an ell,
coſt 3 : 3 of a ſhill.
what 34 : 1 ells coſt.

16

If 18 Pioners in 3 : 5 of a day doe make 23 Rodds of Barricadoe, what will they make in 7 dayes.

If 3 : 5 of a Day
make 22 : 1 of a Wall,
what 7 : 1 of a Day?

770

222	*Rods.*	*Rods.*	
770	(256	23 : 7	
333	1	11 : 8	

If 12 hundred 3:7 of Allum cost 15 pound 1:3 *li.* what will 324, 1:8 of a hundred cost? Reduce the whole and broken numbers into broken, and worke as is before taught.

12	3:7	15	1:3	324	1:8
7		31		8	
87	: 7	46	: 3	2593	: 8

	2038	20663	
If	87:7	2085344	(399
cost	46:3	834946	
what	2593:8	20888	
	834946	2088	
		28	

If 7:9 of an ell coſt 8:11 of a pound, wi
will 15:13 of an ell coſt? 1 pound, 1 ſhill
6 pence, 3:4, *fere.*

Example.

1001		72
7 : 9	77	15
8 :11	13	
15 :13	— —	360
1080	231	72
	77	
	— —	1080
	1001	

79 *l.* *l.*
1080 (1 79 : 1001
1001

1 *l.* 1 *s.* 7 *d. fere.*

If 3:4 of a yard of Velvet coſt 7:8 of a
pound, what wil 28 yards coſt. 32 *l.* 13 *s.* 4 *d.*

Example.

At 18 pence a pound Comfits, what will [illegible] pound cost: for 12 pence take half the given number, and for 6 pence take half that summe, which added into one totall makes 5882 pound, 4 primes.

78432

392 16

19608

5882 4 *Primes.*

The Totall is 5882 *l.* 8 *s.* 0 *d.*

At 6 pence a pound small Ginger, what will 78432. *li.* cost: divide by 4, makes 1960 8 primes, or 16 shillings; which added to 5882 pound, 8 shillings, makes 7843 pound 2 primes, the price at 2 shillings.

2		*l.*	1		5882	4	
78432	(1960	8	11	1960	8	
4444							
				Proofe	7843	2	

These Tables may serue also, if the price [illegible] bee above two shillings, or one prime: as if you

you shall say at 3 shillings, 6 pence an elle what 782 elles: heere I see the given price is compounded of 7 times 6 pence: wherefore I worke first for 6 pence in dividing by 4, makes 19 pound, 11 pence: which multiply by 7, makes 136 pound, 17 shillings the price of 782 elles at 3 shillings, 6 pence the elle.

At 6 pence an elle, what 782 elles: for 6 pence, 19 pound 11 shillings, which added to the former summe in the last example, makes 156 pound, 8 shillings, which is the summe that 782 elles will cost at 4 shillings the elle.

Example.

3 2	*l.* *s.*	
782	(19 11	
444		

l.	*s.*		
19	11	782	
7	7		3
136	17	*The Proofe.*	156 4

At 4 shillings 8 pence the elle Holland, what will 2348 elles cost. I find 4 shillings 8 pence to bee 14 Groats, so dividing by 6 for one Groat, makes 35 pound, 8 primes: which multiply by 14, makes 501 pound, 4 shillings.

6	l.		388
2348	35	8	14
668			1552
			388
			5432

The Totall. 501 l. 4 *Primes.*

At 15 pence a groce of poynts, what will 2256 grosse cost. 15 Pence is 5 times 3 d. and so I divide 2256 by 8, makes 28 pound, 2 primes; which multiply by 5, makes 140 pound.

8	l.		282
2256	28	2	5
888			1410

Rules.

Rules of Practice by the fourth Table.

If the number of the price given bee any Aliquot part of a ſhilling: enter the fourth Table, and there you ſhall find a Diviſor, by the which if you divide your number given, the Quotient will bee ſhillings, and the remainer parts of one ſhilling. Then to convert your ſhillings into pounds, take one halfe of the Quotient, cutting off the lower number for ſhillings, and the reſt is pounds.

Example.

At 3 farthings a pound Prunes, what will 756 pound waight coſt. Search in the fourth Table, and you ſhall find 16 for your diviſor by the which if you divide 756, the Quotient is 47 ſhillings, 1:4, or 3 pence.

224	s.		4		s.
756	(47 1:4		897652	(56103 1:4	
160			266666		
32			2222	2805|3	3 d.

At

At 1 halfe penny a pound Coporas, what will 8756 pound cost. Divide by 24 makes 364 shillings, of which the one half cutting off the 4 shillings, is 18 pound 4 shillings; and 20 halfe pence remayning. Totall is 18 pound, 4 shillings, 10 pence.

l.	s.	d.
8756	(364	
4444	1814	

At 4 pence a pound Licoras, what will 789 pound cost. Divide by 12, makes 65 pound, 3 shillings.

Againe, at 6 pence a pound, what will 8579 pound cost. Divide by 2, makes 4289 pounds, 9 shillings, 6 pence.

1 Example.

l.	s.	d.
7896	(263	
3333	————	
13 l. 3 s.		

2 Example.

l.	s.	d.
8579	(4289	
2222	————	
214 l. 9 s. 6 d.		

Generall

Generall Rules of Practice without Tables.

Multiply your number given by the sum of pence, that one yard, piece, pound, or elle doth cost, and the product will bee the sum of pence, the whole number given will cost; and then divide that summe of pence by 4, makes the Quotient Groats, and if any remaine, they are pence, alwaies lesse then 4 pence, or one Groat: and secondly againe, divide that Quotient will bee pounds and primes, every prime in value 2 shillings, and the remaines is Groats, alwaies lesse then 6 groats, or 1 prime, which is value 2 shillings.

At 17 pence an elle Canvas, what will 3245 elles cost: Multiply by 17, makes 55165 pence, which divided by 4, makes 13791 Groats, and there will remaine one penny. Secondly, divide that quotient againe by 6, makes 229 pound, 8 primes, and the remainer is 3 groats, or 1 shilling, and so the cost is 229 pound, 17 shillings, 1 penny.

Example.

Example.

3245
17
22715
3245
55165

d.
233 1 Groats.
55265 (13791
44444

Groats.
2533
23792
6666

l. s. d.
229 8 or 17 1

As 3 shillings, 7 pence a yard Holland, what will 753 elles cost? multiply 753 by 88 pence, the price of one ell, makes 66264; which divided, as is before taught, makes 384 pound, 14 shillings, 8 pence.

Example.

Example.

752
43

32336 (8084
3008
4444

32336

Groats.

2242
8884
6666

l. 1344 *d.*

At 7 shillings, 11 pence the elle Cambricks, what will 856 ells cost. I reduce 7 shillings, 11 pence into pence, makes 95 pence; by which multiply 856, makes 81320: which divided as before, makes 338 pound, 16 shillings, 8 pence.

Example.

were, lesse then 33 pound, 6 primes; wher-
re multiply by 8, and divide by the greater
xtreme, 12, makes 22 pound, 4 primes or 8
illings, the answer.

If 120 Pioners in 6 dayes cast 300 rods of
rench, how many shall 600 men cast up in
dayes. If 120 give 300, what will 600
ive? Answer, 1500 Rods.

Secondly, if 6 dayes give 1500 rods, how
any will 4 dayes give? Answere, lesse
ultiply by 4, and divide by 6, makes 1000
Rods.

If 112 pound in 12 moneths gaine 100 *li.*
what wil 340 *li.* gaine in 7 months? Answer:
303 *li.* 4:7.

Secondly, if 12 moneths gaine 303 *li.* 4:7
what will 7 moneths gaine.

Example.

	7		3	
12	2125		6497	*li.* *li.*
7		7	24875	(2177 12
84	14875		8444	
			88	

A generall Rule.

Put alwayes your Diuisor into the same Fraction of your dividend, and your Quotient will bee of the same denomination, that your Dividend was: as in the last example, 12 moneths was turned into sevenths, & also 303 pound 4:7 was turned into sevenths of pounds, and so the Quotient of that division was pounds, and the Fraction of a pound remaining.

If 7 pound in 13 moneths gaine 3 pound, in how long time will 340 pound gaine 60 pound. First, if 7 pound gaine 3 pound, what will 340 pound gaine, makes 145 pound, 5:7 of a pound. Secondly, if 145 pound, 5:7 or 1020:7 aske 13 months, what will 60 pound, or 420:7 gaine. Multiply by 13, and divide by 1020, makes 5 months 6:17 of a moneth.

If 600 great Horses in 5 dayes doe spend 1125 Bushels of oats, how many bushels will serue 1400 Horses for 22 Dayes. First say, if 600 give 1125, what 1400, makes 2625 bushels. Secondly, if 5 spend 2625 bushels, what will 22 dayes spend? Multiply by 22, and divide by 3, makes 11550 bushels.

How

How to worke the double Rule at one operation.

This laſt queſtion, or any other of like nature which is wrought by the double Rule at 2 ſeverall operations may bee anſwered at one in this manner: multiply the three latter numbers, to make your Dividend one into the other; then multiply the 2 former numbers for to make your Diviſor, and then divide the Dividend by the Diviſor, and the quotient will bee the ſame, as in the laſt example, 1125 being multiplyed by 1400, makes 1575000; which againe multiplyed by 22, makes your dividend 34650000. Then multiply your 2 former numbers 600 by 5, makes 3000 for the Diviſor; and then dividing your Dividend by your Diviſor 3000, the Quotient will be 11550 buſhels, as before at two operations.

Example.

Example.

1125
1400

4500 600
1125 5

15750000 3000
22

31500
31500

346500000 22 Bushels.

346500000 (11550
33333000

If 35 s. in 7 moneths gaine 6 s. in how long time will 340 l. gaine 100 l. First if 35 s. gaine 6 s. what will 340 l. require? Reduce 340 l. into pence, and multiply by 6, makes 40800; which divided by 35, makes 1165 s. 5:7 s. Secondly, if 1165 s. 5:7 require 7 moneths, what will 100 l. require? Makes 12 moneths, 8:816 parts of a moneth.

Fellowship

Fellowship without Time.

This Rule differeth very little from the Rule of three; for in this Rule the ſum of all the moneys diſburſed, is the firſt number in the Golden Rule. Then the gaines or loſſe is the ſecond number: the third number is each ſeverall partners money diſburſed: ſo that the Rule muſt be ſeverally wrought for each ſeverall partners portion.

Example.

Foure Merchants made a company toge-ther, the firſt, *viz. A.* put in ſtock 74 pound, *B.* put in 90 pound, *C.* put in 100 pound, and *D.* put in 120 pound, and they found that they had gained 84 pound; now the queſti-on is, what each man muſt have of the gaines, according to the proportion of his money diſburſed. Firſt, add all the moneys diſburſed into one totall ſumme, *viz.* 74, 90, 100, 120, Totall is 384 for the firſt number in the Golden Rule. Then the ſecond num-ber is 84 pound, the gaines; and the third number is each particular mans ſtocke; then worke as followeth.

If 384 pound gaine 84 pound, what will A. B. C. D. sums gaine to them.

A.	74	16.	72	
B.	90	19.	264	
C.	100	21.	336	
D.	120	26.	96	
The proofe.	384	84.	768 (2	
			384	

The like reason is in losse, as is in gaines. Example: A certaine Shippe being in a tempest on the sea was forced to cast over board so much of her lading, as amounted unto the summe of 642 pound, then there is great reason that all the Venturers should beare part of that losse, according to the proportion of his stocke which he ventured. As suppose: *A.* ventured 700 pound; *B.* 530 pound, *C.* 640 pound, *D.* 800 pound; totall is 2670. Then say: If 2670 pound loose 642 pound, what will each of *A. B. C. D.* loose? as in the example following.

Example.

Example.

If 2670 pound loose 642 pound, what wil A. B. C. D. summes loose to them.

A.	700	168.	84	
B.	530	127.	117.	267
C.	640	153.	237	
D.	800	192.	96	
		2		

The proofe. 2670. 642 534 (2
267

Foure Merchants bought a ship, which cost them 3600 pound, whereof *A.* must pay one third part of the money, *B.* one fourth, *C.* one fifth, *D.* one sixth: the Question is, what each man must pay of the said summe. Answere.

Seeke a number wherein the like parts may bee had, which is 60, and take the like parts of that number for the numbers that you seeke, for to find each mans portion of the money which he should pay. First, 1:3 of 60 is 20, the 1:4 is 15, the 1:5 is 12, the 1:6 is 10; which adde into one totall, makes 57 for the first number in the Golden Rule.

Example,

Example.

Of 60 is 20.
is 15.
is 12.
is 10.

If 57 be 3600, what will bee the summes of *A. B. C. D.*

A.	20	1263.	9	
B.	15	947.	31	
C.	12	757.	31	57
D.	10	631.	33	
		2		

The proofe. 57 3600 (63 57

The said ship made a Voyage to Sea, and hath gotten all charges, deducted out 240 pound, the question is, what each man must have of the gaines. answere.

If 57 gaine 240, what will *A. B. C. D.* summes gaine to them.

A.	20	84.	12	
B.	15	63.	9	
C.	12	50.	30	57
D.	10	42.	6	
		1.		

The proofe. 57 240 57

57

Toure

Foure Merchants made a Company; *A.* ut in 320 pound, 13 ſhillings, 3 pence; *B.* ut in 840 pound 16 ſhillings, 6 pence; *C.* ut in 560 pound, 18 ſhillings, 9 pence; *D.* 600 pound: and in one yeare they found hey had gained 400 pound, 18 ſhillings, pence: the Queſtion is, what each man uſt have of the gaines. Firſt, the totall ſum f all their moneys makes 2721 pound, 8 illings, 6 pence, or 653142 pence, for the rſt number. Then reduce each ſeverall ma. oney diſburſed into pence for the third umber, the ſecond is the gaines alſo reduced nto pence, and then worke according to the ule.

Example.

If 2721 pound, 8 ſhillings, 6 pence gaine 00 pound, 18 ſhillings, 6 pence, what will *A. B. C. D.* ſummes gaine to them.

	d.	*li.*	*s.*	*d.*
A.	769311 makes	57.	2.	1
B.	201798 makes	123.	17.	3
C.	134525 makes	82.	12.	9
D.	240000 makes	147.	6.	5
The proofe.		400.	18.	6

Rules of Fellowship, with diversity of Time.

Multiply each mans money disbursed the time that it continued in stocke, and gether the totals, as in the last Rule, to ma the first terme in the Golden Rule, and t gaines or losse is the second, and then ea mans Product of money and time for t third terme in the Golden Rule, and wor as followeth.

Example.

Three men made a stock, A. B. and C. in long continuance of time by danger adventures they gained; and got by pri taken at Sea 2345 pound; A. put in stoc 40 pound, 14 moneths; B. put in 50 pou 8 moneths; C. put in 85 pound 6 monet what shall each man have of this gaines.

Exam

Example.

	l.	*months.*		*l.*	*months.*		*l.*	*months.*
A.	40.	14	B.	50.	8.	C.	85.	6
	14			8			6	
	560			400			510	

If 1470 pound gaine 2345 pound, what will A. B. C. summes gaine them.

A.	560	893. 7		
B.	400	638. 2	21	
C.	510	813. 12		
	1470	2345	22	(1
			22	

The second question with more diversity of time, foure Merchants made a Company; A. put in 340 *li.* 19 *s.* 2 *d.* for 10 moneths; B. put in 930 *li.* for 9 moneths: C. put in 760 *li.* for 12 moneths; D. put in 583 *li.* 13 *s.* 4 *d.* for 5 moneths, wherewith they gained 740 *li.* now the Question is, to know what each man must have of this gaines.

Example.

	li.	*s.*	*d.*	*month.*
A.	340.	19.	2.	10.

20

6819

12 *d.*

13640
6819

81330

10 *month.*

818300

B. 930 *li.* 9. *moneths.*

9

8370
240

334800
16740

2008800 *pence.*

C. 760 *li.* 12. *moneths.*

240

30400
1520

182400
12 *months.*

2188800

D. 583 *li.* 13 *s.* 4 *d.* 5 *months.*

20

11673
12

23350
11673

140080
5 *moneths.*

700400

A.	8183	00
B.	20088	00
C.	21888	00
D.	7004	00
	57163	00

Cut off two Cyphers from each number, and then worke as followeth.

If 57163 pence gaine 1776 pence, what will A. B. C. D. summes gaine them.

		l.	*s.*	*d.*	*d.*
A.	8183	105	18	7	4:5
B.	20088	260	00	11	3:5
C.	21888	283	6	11	4:5
D.	7004	90	13	4	4:5
			3	3	
The proofe.	57163	740	00	0	15:5
					5(3

Example.

There is a Booty or Spoyle taken by 3 men worth 7851 pound, and they agree to divide it in this sort; A. is to have 1 halfe, B. 1 third, C. one fourth, what is each mans share.

To

To worke this Question, and all other of like nature, seeke a number which may bee divided by all the Denominators of your 3 Fractions in whole numbers, and the smaller such a number be that you choose, the more easie will your worke be; which for to find, multiply your Denominators of your Fractions one into another: that is to say, 2 by 3 makes 6; and 6 by 4, makes 24; so 12, one halfe of 24 will be evenly divided by all the 3 Denominators, 2 3 and 4. Wherefore I take 1:2 of 12 is 6, and 1:3 of 12 is 4, 1:4 of 12 is 3; which added into one summe makes 13 for first number in the Golden Rule; the second is 7851 pound, and the third numbers are each severall mans portion imagined to be, *viz.* 6,4,3, and then worke as before.

If 13 give 7851 pound, what will A. B. C. summes giue.

			li.		
A.	6	3623.	7		
B	4	2415.	9	13	
C.	3	1811.	10		
			2		

The proofe. | 13 | 7851 | 26 (2
23

Example.

Foure Merchants bought a house together which cost 3000 pound; A. was to pay 1:2 and 6 pound overplus; B. 1:3 and 12 pound more; C. 8 pound lesse then 2:3; D. 1:4 with 20 pound overplus. Now the question is, what each Merchant must pay of this sum. Answer: First, the pounds overplus must be subtracted from the summe given; and the pounds wanting must be added to the summe given; as for A. 6 pound, for B. 12 pound, for D. 20 pound, totall is 38 pound, to bee subtracted then; for C. adde 8 pound, therefore subtract 30 pound from 3000 pound, there will remaine 2970 pound; then worke by the Rule of Fellowship, taking 12 for a number, which will be divided by all the denominators, 2, 3 and 4, *viz.* take for A. 6, for B. 4, for C. 8, for D 3; totall is 21 for divisor, the second number is 2970 pound, the third, each mans part imagined.

Fellowship

Example.

If 21 give 2970 pound, what will A. B. C. D. summes give.

A.	6	848	4:7	854.	4	
B.	4	565	5:7	577.	5	
C.	8	1131	3:7	1123.	3	
D.	3	424	2:7	444.	2	
		2		2		

21	2970.	24	2	3000.	24
The proofe.		7			7

The numbers found to A. are 848 pound 4:7, to which if you adde 6 pound, makes 854 pound, 4:7.

To B. 565 pound, to which 12 pound added makes 577 pound, 5:7.

To C. 1131 pound, 3:7, from which subtract 8, leaves 1123 pound, 3:7

To D. 424 pound, 2:7, to which adde 20 pound, makes 444 pound, 2:7, the which added into one total, makes 3000 pound, the proofe.

And in this manner may infinite variety of questions bee propounded, and their doubts easily resolved; and here will I ende con-

concerning this Rule, and goe in hand with some pleasant Questions to bee wrought by position, which is the most excellent Rule of all others in Arithmetick, as shall appeare in the second part of this Booke in Decimall Arithmetick.

Position.

The Rule of Position requiring one number to be imagined, before the principall proportion can be found.

TO worke by this Rule; Take any number at pleasure, which you shall imagine to bee the true number sought, and proceed with it, as if it were the true number, wherin if you have failed, by doubling or tripling according to the nature of the Question, you shall then attaine unto the true number desired, by aide of the Golden Rule, in manner following: for looke what proportion is betweene the false conclusion, and the false position, such proportion hath the given number, to the number sought.

Example.

Example.

A. B and *C.* consent to buy a ship, which will cost them 2700 pound, so that *B.* must pay twice so much as *A.* and *C.* must pay 4 times so much as *B.* the Question is, what each man must pay of this summe? I suppose *A.* must pay 8 pound, then *B.* must pay twice as much as *A* which is 16 pound; then *C* must pay 64 pound, which is 4 times as much as *B*: but yet 8 pounds, 16 pound, and 64 pound, is but 88 pound and it should be 2700 pound, so that now I resort to the Golden Rule, and worke as followeth. If 88 pound come of my Position 8 pound, of what comes 2700? Multiply 2700 by 8, and then divide by 88, makes 245 pound 40:88, or 5:11 of a pound for the part that *A* must pay; then *B* must pay 490 pound, 10:11 of a pound, which is twice as much as *A*, and *C* must pay 1960 pound, 40:11 of a pound, which is 4 times as much as *B*. The totall summe is 2700 pound. Behold worke as followeth.

If

If 88 pound come of 8 pound, of wha comes 2700.

```
  44
 4080      l.
21600 (245   40:88, or 5:11
 8888
   88
```

2700
8
21600

2 Example.

A Captaine of a Band of Men being asked, what number of Souldiers were in his Band, answered, I doe not readily know; yet (quoth he) of this I am certaine, that the 1:2 and 2:3, and 4:5, and 1:6 of their number added together into one sum, are 384 men: now the question is, what summe of men he had in his Band. I suppose he had 60 men, or 30 men in his Band, but the least number is best, *viz.* 30, whereof 1:2 is 15, and 2:3 is 20, and 4:5 is 24, also 1:6 is 5, their totall is but 64 men, but that should bee 384 men, Then say by the Golden Rule, as followeth:

If

If 64 come of 30, of what number comes 384.

384		320	*men.*
30		22920	(180
		6444	
11520		66	

Answere: hee had 180 men in his Band, whereof

1 : 2 is 90 men,
2 : 3 is 120,
4 : 5 is 144,
1 : 6 is 30.

Totall is 384 *men.*

The solution of this Question another way more briefe.

Divide 384 by 64, makes 6; which multiply by 30, makes 180 men, as before.

3 *Example.*

A certaine man having spent 120 pound, had yet remaining 1 : 2 and 1 : 3 of his whole substance; the Question is, what his substance was. Answere: First, 1 : 2 and 1 : 3

is 5:6, which being taken from 6:6, the whole substance leaves remaining 1:6; therfore if 1:6 be 40 pound, what is 6:6? makes 240 pound.

li.
40
6

240

4 Example.

A Merchant bought 384 yards of broad-Cloth of 3 severall prices, of each a like quantity, and he was to pay halfe as much more for the second sort, as he payed for the first, and twice as much for the third sort, as he payed for the second: now the Question is, what each sort cost him, and at what price every yard was rated unto him? I suppose the first sort cost him 4 pound, then the second sort must cost him 6 pound, which is halfe as much more as the first, and then the third sort cost him 12 pound, which is twice as much as the second; the totall is but 22 pound, but it should be 248 pound: wherefore if 22 pound come of 4 pound, of what number comes 248 pound?

Example.

Example.

11		248 li.
992 (45.	1:11	4
222		992
2		

The first cost him 45 pound, 1:11 of a pound; then the second sort cost 67 pound, 1:11 of a pound; the third sort cost 135 pound, 3:11 of a pound, totall is 248 pound: then divide 384 by 3, and you shall find he had 128 yards of each sort, and by Practice, you shall find the first sort cost 7 shillings, 1:2d. a yard; the second sort cost 10 shillings 7 pence a yard almost, the third sort cost 21 shillings, 1 penny, 1:2 d.

Double

Double Position.

The Rule of double Position.

SVppose a number at pleasure, as in the last Rule of single Position, and proceed as if you had found the right number, and if by working you find the true number, then your Position was the right number, which doth seldome happen. First, if by your working there commeth out more then the true number, then note it thus +|- with a Crosse; if lesse, then thus —— with a long line, which doth signifie lesse.

Secondly, suppose another number, greater or smaller, and worke as before, untill you do find the true number sought; which if you doe not find, see the difference also from the true number sought, and note it with the signe -|- or —— as it shall be found.

Then thirdly, set your suppositions with their errours, more or lesse, as in the examples following.

Fourthly, multiply crosse the first position by the seconds errour, & the second position

by the errour of the first, and then if the signes bee both alike -|- or ——, abate the lesser from the greater, and the remaines shall bee the dividend. Also the lesser error abated from the greater, leaves the Divisor; but if the signes bee contrary one -|-, the other lesse, add both together to make the dividend, and add the two errors to make the Divisor: and lastly, divide the Dividend by the Divisor, and the Quotient is the true number desired.

1 *Example.*

A certaine man seeing a purse in his friends hand, saith unto him: It seemeth unto me, that there is 100 Crownes in your purse. To whom the other answered: Nay (quoth he) there are not 100 Crownes, but (saith he) if they were increased 1:2 and 1:3: and 1:4, and lastly, one Crowne overplus, then would they be just 100 Crownes.

I suppose there were 12 Crownes in his purse, to which if I adde one halfe, of 12, which is 6; and one third of 12, which is 4; and one fourth of 12, which is 3; and lastly, one Crowne more, the Totall will be but 26 Crownes, but they should be 100 Crownes,

so

so that this errour is too little by 7
Crownes, which I note thus:

74——11

Secondly, I suppose he had 24 Crownes
to which I adde 1:2 of 24, which is 12 and
1:3, which is 8 and 1:4, which is 6: and
lastly, one Crowne overplus, the totall is 51
but it should be 100 Crownes, so that this
is an errour of 49, too little, which I also note
thus: 49——24

588	74	49
74——12	24	12
49——24		
1776	296	98
588	148	49
1188	1776	588
74	213	
49	1188 (47.	13:25
	259	
25	2	

The

The answere is; that hee had 47 pound :: 5 parts of a pound in his purse. The poſe followeth.

2 of 47 *li.* 13:25 of a *li.* is	23:19	
3 is	15:21	25
4 is	11:22	
done Crowne overplus is	1:00	
	47:13	
The proofe.	100:75	

2 *Example.*

Twenty yards of Sattin, and 12 ſhillings equall unto 12 yards of Velvet leſſe, 10 illings; the price of either ſort is requi-d.

To anſwere this, or any other like queſti-, take any number for the price of a yard the leſſer number, which here is Velvet, hich at 20 ſhillings a yard, leſſe 10 ſhil-gs, amounteth unto 230 ſhillings. Now mit a yard of Sattin at 14 ſhillings, ſo 20 rds and 12 ſhillings amounteth unto 292 illings; from which ſubtract 230 ſhil-gs, reſts 62 *s.* more then the truth. A-

gaine,

Againe, rate a yard at 12 ſhillings, ſo the yards and 12 ſhillings makes 252 ſhillings from which take 230 ſhillings, reſts 22 ſhillings more then the truth alſo. Now multiplying 22 by 14, and 62 by 12, the products are 308, and 744, and the difference of thoſe numbers is 436, then take 22 from 62, reſts 40 for diviſor, by which divide the difference, makes 10 ſhillings, 9:10 ſhillings for the price of a yard of Sattin.

Example.

62	
22	12
14	
124	
88	
22	62
308	744
	308
	436

Difference.

2 { 14 -|- 62 } *Diviſor* 40
{ 12 -|- 22 }

s.	s.
436	(10. 9:10
440	

3 *Example.*

3 Example.

Otherwaies if 40, the difference of errors giue 2, the difference of positions, then 62 the first error yeelds 3 and 1:10

Or if 40 yeeld 2, what 22? makes 1 and 1:10; this taken from 12, or 3, 1:10 from 14, leaves 10, 9:10 for the price, as before.

4 Example.

A Carpenter was hired to worke 20 daies at 12 pence a day, but every day that he was idle, he was to abate 18 pence of his wages, and in the end hee received but 8 shillings: now the Question is, how many dayes hee wrought.

First, suppose he wrought 12 daies, which commeth to 12 shillings, then must the 8 dayes that he played, come to 12 shillings at 18 pence a day also: but this Question saith, there came due to him 8 shillings. Behold an error of 8 shillings too little.

Againe, I say that hee wrought 14 dayes amounting to 14 shillings: then 6 dayes that he played at 18 pence a day, commeth to 9 shillings; this taken from 14 shillings, leaves

leaves 5 shillings, and it should bee 8 shillings, which is an errour of 3 shillings too little. Now multiplying 12 by 3, and 14 by 8, the Products are 36. and 112, and the excesse is 76; which being divided by 5, the difference of the errours, quoteth out 15, for the number of working dayes, & 4 dayes 4:5 for the number of playing dayes.

12 —— 8 }
} 5
14 —— 3 }

Otherwayes.

If 5, the difference of errours, yeeld 2, the difference of positions, what 8 the first errour? makes 3, 1:5 to be added to 12.

Or if 5 bee 2, what is 3? makes 1, 2:5 to be added to the second position 14, whereby all three wayes the numbers of the dayes hee wrought are found out.

Barter or Exchange.

TWo men Barter, one hath Ginger of 10 pence a pound ready money, and in barter he will ſell it for 12 pence a pound. The other hath Sugar of 12 pence a pound ready money, but in barter he will ſell it for 14 pence a pound; the Queſtion is, how much Sugar will pay for 756 pound of Ginger? Firſt, put your price of your Ginger into pence, makes 9072 pence; which divide by 14 pence, makes 648 pound of Sugar, which muſt be given for 756 pound of Ginger, at 12 pence the pound.

2 *Example.*

Two Merchants will barter, one hath rayſons of 34 ſhillings the hundred ready money, and in barter hee will ſell them for 40 ſhillings; the other hath Nut-megs of 4 ſhillings the pound ready money, how ſhall he ſet his Nut-megs to make the like profit. Put your coyne into pence, and ſay; If 408 *d.* be 480 *d.* what is 48 *d.* Multiply 480 by 48, and divide by 408, makes 56 *d.* 2 5:5 of one penny for the price of the Nut-megs; *vid* 4 *s.* 8 *d.* 1:2 of a pound.

3 *Example.*

3 Example.

Two Merchants will barter, one hath Holland of 2 shillings, 7 pence the ell ready money, which he will sell in barter for 2 shillings, 10 pence the ell, and yet hee will gain privately 10 pound in 100 pound over the gaine; at what price must hee then set his Holland? Answer: set downe 2 shillings 10 pence in pence, makes 34 pence; of which take the tenth part, which is 3 pence, 4:10 or 2:5, and adde to 34 pence, makes 37 pence 2:5, of a penny for the price, to sell one ell to make that gaines. Now the other Merchant hath wooll at 7 shillings a Todde ready money, how shal he sell his Wooll to make like profit that hee bee not deceived in the bargaine. If 31 pence bee 37 pence, 2:5, what is 84 pence? Multiply 374 primes by 84, makes 31416; which divide by 31, makes 101 pence, 3:10 penny, or 8 shillings, 5 pence, 3. 10 of one penny, which is the price for him to sell his wooll to make like profit.

Example.

Example.

34 374
34 84
——— ———
1496
374 2992
———
31416

1
103 d.
31416 (101. 3:10 of 1 penny.
31111
333

4 *Example.*

Two Merchants will barter, one hath Sugar of 6 pound, 4 shillings ready money, and he will sell it for 7 pound the hundred. The other hath Ginger of 4 pound, 6 shillings the hundred, and in barter hee will sell it for 5 pound the hundred; now the question is, what rate each of them doth gaine *per cent* and which hath the advantage of the other.

First, if 6 pound, 2 primes gaine 8 prim[es], what will 100 pound gaine? Multiply primes by 10[0], makes 800 primes; then add 2. or 3 cyphers more to it, which divide 6:2 primes, makes 12 *l.* 9 primes, 10:31 a prime, or neare 12 *l.* 18 shilling, 8 pence which the first man doth gaine *per cent.*

Secondly, if 4 pound, 3 primes gaine primes, what will 100 pound gaine? Multiply 7 primes by 100, and adde 2 Cyphes more, makes 70000; which divide by 4: primes, makes 16 pound, 2 primes, 34:43 a prime; from which subtract 12 pound, 1[8] shillings, 8 pence, rests 3 pound, 6 shillings 2 pence, which the second man hath gained more then the first gained.

6 Example.

Two Marchants barter, one hath a certaine number of pieces of Sakkins at 18 shillings a piece, for the which the other doth give him 1806 ells of linnen Cloth, at 1[2] pence the ell, and yet 30 pound in ready money; the Question is, how many pieces of Sakkin he had. First, find what 1806 ells of linnen Cloth cost by Practice? makes 1[80] pound, 8 shillings: to the which adde 30

pound

nd, makes 150 pound, 8 shillings: then ide 150 pound, 4 primes, by 18 shillings, 9 primes, makes 167 pieces of Sakkin, 1:9 of a piece.

Example.

2	*l.*	1
28980	(120.	4
25599	30	
	150.	4

661	*Pieces.*	*Piece.*
2504	(167	1:9
999		

6 Example.

Two men will barter, one hath Pepper of 21 pence the pound ready money, but in barter hee will sell it for 27 pence the pound: the other hath Sinamond of 3 shilling, 6 pence the pound ready money, and in barter hee will sell it for 4 shilling the pound; the question is, how much Synamond pay

pound of Pepper at that rate? Fi
384 pound of Pepper at 27 pence the pou
is 43 pound 4 shillings: which divide 43
primes, makes 216 pound Sixtmond, wh
he must give.

7 Example.

If 4 English elles make 5 yards, and 1
yards, makes 50 Pawnes at Geanes, how m
ny Pawnes is in 100 elles English. If 5 be 4
what is 13, makes 10 2:5. Secondly, if 1
2:5 be 50, what is 100, 480 10:13.

8 Example.

Every 4 elles at *Antwerpe* maketh 5 a
Frankford, and 25 there makes 24 Braces a
Luques, the Question is, how many braces i
100 in *Antwerpe*. If 25 be 24, what is 5,
makes 4 4:5. Secondly, if 4 be 4 4:5, wha
are 100, makes 120.

9 Example.

If 4 yards at *London* be 4 elles at *Antwerpe*
how many yards at *London* make 84 elles at
Antwerpe. If 4 be 3, what 84 makes 63 ells.

10 Example.

10 *Example.*

At *Roan* 112 elles make but 98, and 100 ells at *Roan* is 112 at *Sivil*, how many of ours 100 ells of *Sivill*. If 98 *Roan* be 112 ells, what 100 *Roan*, makes 114 ells 1:7 of an ell. Secondly, if 112 ells be 114 1:7, what is 100 *Sivill*, makes 102, 19:25.

11 *Example.*

If 67 yards at *London* bee 109 in *Venice*; how many are 7894? multiply by 67, makes 5288 yards, 94 100 parts.

12 *Example.*

A Merchant doth deliver 400 pound sterling in *London* by exchange for *Antwerpe*, at 33 shillings, 5 pence the pound sterling, the Question is how much Flemish money, hee shall receive at *Antwerpe*: put your 33 s. 5 d. into pence, makes 281 pence, which multiply by 400, makes 112400 pence; which divide by 240, makes 468 pound, 6 shillings, 8 pence, which he must receive at *Antwerpe*.

Example.

s.	d.		
23.	5		
12			281
			4
276			1124
5			
281			

l.	s.	d.	
2	8	8	
212400 (468.	3.	8	
244440			
222			

Example.

If 100 pound ſtarling bee 134 pound, 6 ſhillings, 4 pence Flemmiſh, what is one pound ſtarling worth? reduce your coyne 134 *l.* 6 *s.* 4 pence, into pence makes 32236; which divided by 100, makes 322 pence, 9:25 pence, or 26 ſhillings, 10 pence, 9:25 of one penny, for one pound ſterling.

If one pound ſterling be 1 pound, 14 ſhillings

gs, 7 pence, *ob.* Flemish, how much ster-
g money is in 100 *li.* Flemmish? Reduce
o pound into pence, makes 240.0 pence;
en put it into halfe pence, makes 48000
lfe pence; then put 1 pound, 14 shillings,
pence, *ob.* into halfe pence, makes 831; by
hich divide 48000, makes 57 pound, 15
illings, 1 penny almost, and so much ster-
ng money is in 100 pound of Flemish mo-
ey at that rate.

Of Gaine, and Losse.

IF 13 pieces of Canvas cost 17 pound, 12 shillings, how may I sell them to gaine 8 pound in the hundred? Multiply 176|600 by 8, makes 19 pound, 19 | 008, or two pence almost, and so much must he sell them for to gaine 8 pound in the hundred.

If 17 pound, 12 shillings gaine 1 pound 8 shillings, 2 pence, what will 100 poun gaine? Multiply 1 pound, 8 shillings, 2 pence in Decimalls by 100, & divide by 17 pound, 6 primes, makes 8 pound in the 100, the proofe.

Example.

17600
8
1408

2408 (8
278

1408

19008

A Merchant hath lent 630 pound at interest for 10 pound in the 100 for 3 yeeres interest upon interest, the Question is, unto what summe it will amount unto at the end of the terme? Answere: Take the teath part, and adde it into one totall 3 severall times, makes 838 pound, 10 shillings, 7 pence, 1:5 of a penny for principall and interest, at the rate given, to be paid at the end of three yeares.

Example.

Example.

1. yeare. 2. yeares, 3. yeare.

630 6930 76230

630 6930 76230

6930

693|0 762|30 838|530

2 Example.

A Merchant receiveth for principall and interest 838 pound, 10 shillings, 7 pence, 1/5 of a penny at 10 pound in the hundred compound interest, which was for money delivered out for 3 yeres: now the Question is, what was the summe of money that was lent? To doe this, or any other the like Question, divide the summe of money received by 110 three severall times, and the three quotients will shew the yearely increase of the money lent, and the last quotient will be the answer to the Question, or the money disbursed, as in the Example following, which is the proofe of the former Question.

Example.

623 203
838530 (762330 (6930
2222220 22220
222 22

3
6930 (630 *pound lent.*
2220
2

3 Example.

A Merchant lent 100 pound for 7 yeares at 10 pound in the hundred Compound Interest, the Question is, what he shall receive at the end of the terme.

Example.

Example.

100 |
10 | 0
——— one yeare 100 *li.*
110 | 0
11 | 00
——— 2 yeares, 121 *li.*
121 | 00
12 | 100
——— 3 yeare 133 *li.* 2 *s.* 0 *d.*
133 | 100
13 | 3100
——— 4 yeare 146 *l.* 8 *s.* 2 *d.* ob.
146 | 4100
14 | 64100
——— 5 yeare 161 *li.* 1 *s.*
161 | 05100
16 | 105100
——— 6 yere 177 *li.* 3 *s.* 1 *d.* ob.
177 | 156100
17 | 71561
——— 7 yeare 194 *l.* 17 *s.* 5 *d.*
194 | 871710

Makes at 7 yeares end 194 *li.* 17 *s.* 5 *d.*

How

How to worke Compound interest at any rate per cent.

What is the principall and interest of 352 pound, put out at 8 pound in the hundred compound Interest, to bee paid at the end of two yeares? Adde 2 cyphers to 352 pound, makes 35200; then place your interest 8 under the lowest Cypher next the right hand, and multiply 352 by 8, placing the Product under the line, and that will be the interest: which added into the summe lent, makes the totall of the principall and interest, and so worke for the second, third, and fourth yeare, as in the example.

1. *yeare.*	
35200	380160
8	8
2816	30412 8
38016	410578

or 380 *li.* 3 *s.* 2 *d.* 3 *q.* | or 410 *li.* 11 *s.* 5 *d.*

First,

First I multiply 35200 by 8, makes 2816, which I adde unto 35200, makes 38016; then I multiply 3801600 by 8, makes 10|5728, or 11 shillings, 5 pence, abating 4 figures for the 4 cyphers, which I added to the summe for to find out the prime line, as appeareth in the example; and so of any other summe or rate in the hundred.

At 17 pound the hundred *per annum* compound interest, what will 879 pound amount unto to bee all forborne unto the end of 5 yeares? Adde 2 cyphers to your summe given, and multiply by your Interest 17, and adde into the principall, and so worke 5 yeares, and the last product will bee the sum of money to be received, *viz.* 1927 pound, 3 shillings, 5 pence.

Example.

87908
17

61536
879

First yeare.

1028 | 43000
17
---
17 | 9901
2 | 8431
---
2 yeares.

1203 | 263100
17

184228417
2032631

Three yeare.

1407 | 81782700
17

1985 | 4724789
407 | 817827

Foure yeares.

1647 | 1468575900

1647 &c.

647	1 4 6 8 5 7 5 9 0 0
	1 7

715	3 0 0 2 8 0 0 3 1 3
164	7 1 4 6 8 5 7 5 9

five yeares.

927	1 6 1 8 2 3 3 8 0 3

li.	s.	d.
1927.	3.	5.

If a Merchant buy a parcell of Holland, at 3 pound, 6 shillings the piece; and another parcell at 4 pound, 2 shillings the piece; the third sort at 4 pound 10 shillings the piece, the fourth sort at 5 pound the piece; how may he sell 40 pieces, of each sort 10 pieces to gaine 18 pound in the hundred, and give 9 moneths time for the payment; as in the example following.

Example.

Example.

10 Pieces at	3.	6.	a piece,
10 Pieces at	4.	2.	a piece,
10 Pieces at	4.	10.	a piece,
10 Pieces at	5.	0.	a piece.

The summe is 169. 0.

16900

Take the 3:4:5:6 of the interest, makes 9 pound, 16 shillings, 3 pence, 3 quarters penny, to sell to gaine 18 pound in the hundred, for to give 9 moneths time.

A Merchant sold 300 quarters of Wheat, cost him 35 a pound ready money, and lost 7 pound in the hundred, what did one quarter cost him, and at what rate did he sell a quarter, to loose 7 pound in the hundred? Take the interest at 7 pound in the hundred, which

which is 24 pound, 12 shillings, 9 pence, 1:5, which subtract from 352 li. makes 327 pound, 7 shillings, 2 pence, 2:5 of a penny, and divide the remainer by 300, makes 1 pound, 1 shilling, 10 pence for the price sold: secondly, divide 352 pound by 300, makes 1 pound, 2 shillings, 5 pence ob. for the price which it cost him.

Rie sold for 3 shillings a bushell looseth 10 pound in the hundred, what will then be lost, if it bee sold for 3 shillings 6 pence a bushell? If 3 shillings be 80 pound, what is 3 shillings 6 pence? Multiply 80 pound by 3 1:2, or by 3 shillings, 6 pence, makes 280; which divide by 3, makes 93 li. 1:3. Otherwise, if 36 pence be 80 pound, what is 42 pence? Multiply 80 by 42, and divide by 36, makes 93 pound 1:3 of a pound as before.

If in one ell of Cloth sold for 3 shillings, 2 pence there were gained after the rate of 10 pound in the hundred, what did that ell of cloth cost? divide 385, or 38 penny 1:2 by 110, makes 35 pence that the ell cost.

3890 (35 d.
2100

If one yard of Holland cloth cost 2 shillings, 1:1 pence, how many yards shall I buy for 34 pound, 6 shillings, put it into pence, makes 8232 pence; which divide by 35 pence, makes 235 yards, 1:5 yard.

How to gaine any rate in the Hundred you desire.

Put your price that one yard, ell, pound or piece doth cost you into pence; and then for 10 pound in the hundred, take the tenth part of that sum, which is the same number, placed one place nearer to the right hand, and that is the profit or Interest; which added up into the price given, makes the price to sell one yard, pound, ell, or piece, to gaine 10 pound in the hundred ready money.

Example.

If one ell of Holland cloth cost 3 shillings, 9 pence, how may I sell to gaine 10 pound *per cent'* ready money? Put 3 shillings 9 pence into pence, makes 45 pence: then take the tenth part of 45 pence, which is 4 pence 5:10, or one halfe, makes 49 *d.* 1:2 for the price to sell an ell to gaine 10 *li. per cent.*

Example.

Example.

d.		s.	d.	d.
45	makes	4.	1.	1:2
4 | 5		d.		
49 | 5		7 | 4	s.	d.	d.
			makes 6.	9.	2:5
		81 | 4			

If your price you would gaine, be not 10 pound in hundred, then adde 2 Cyphers to your number of pence given, and multiply that number by your Interest, omitting to multiply by the cyphers, and the product under the line is your Interest or gaine, which added up into one summe; makes the price to sell one yard, ell, pound, or piece, to gaine according to the rate desired example.

If one pound of Cloves cost 4 shillings, 10 pence, how may I sell to gaine 9 pound *per cent* ready money? Put 4 *s.* 10 *d.* into pence, makes 58 *d* then add 2 cyphers, makes 5800; which multiply by 9, makes 5:22 or 5 pence, 22:100 parts of one penny; which added up to the upper numbers, is 63 pence, 22:100 parts of one penny, or 5 shillings,

shillings, 3 pence, 1:5 of a penny for the price to sell one, to gaine 9 pound in the hundred.

At 9 pound in the hundred.	At 12 pound in the hundred.
5800	4700
522	494
7	
3654	
or 15. 4. 6.	or 41. 2. 10.

If one piece of Rayſons coſt 18 ſhillings, 9 pence; how may I ſell to gaine 18 pound in the hundred ready money? put your money into pence, makes 225 pence, to which adde 2 cyphers, makes 22500; which multiply by 18, makes 4050, or 40 pence, *ob.* which added into the price makes 265 pence, *ob.* for the price to ſell one piece to gaine 18 pound in the hundred.

Example.

Example.

225 | 00
18 | 00
22 | 5
265 | 50

21
265 (12 s. 1 d. 06. for the price of 1 piece.
22
5

A Merchant lent wares for 10 pound in the hundred profit for 12 moneths, and at the end of 6 moneths he received principall and interest 356 li. the question is, what was the sum lent? Answer, adde 2 Cyphers to 356 pound, and divide by 105 pound, which is 6 moneths interest and principall, makes 339 pound 1 1 parts of a pound for the sum lent.

A Merchant is to pay at divers payments 200 pound at 8 moneths, 140 pound at 6 moneths,

Example.

Example.

9
4255 li. li.
35600 (339. 5:105
20555
200
2

Interest for 3390|5
339|05 yeares.

Interest for 169|525 1:2 yeare.

The proofe. 356|00

Equation of Payment.

The Rule of payment is to bring divers payments due at severall dayes to be payed at one intire payment.

A Merchant is to pay at divers payments 600 pound: *viz.* 200 pound present, 200 pound at 8 moneths, 140 pound at 6 moneths,

moneths, and 60 pound at 2 moneths: now he is willing to pay all at one payment, what time must be given? The ready mony being omitted, set the rest as Numerators thus, 200:600 140:600 60:600 parts, which in their least tearmes abbreviated makes 1:3 7:30 and 1:10. Now multiply 1:3 by 8, makes 2, and 2:3; secondly, 7:30 by 6, makes 1 and 2:5; thirdly, 1:10 by 2 makes 1:5; totall is 4 moneths, and 4:15 of a month for the time sought.

Example.

200:8 3
105:7 5
15:2 5

320 75

2.
320(4 moneths, 20:75.
75

A Merchant hath owing him 752 pound, to bee payd 200 pound present; 200 pound at 3 moneths, 130 pound at 5 moneths, and the rest at 12 moneths; now at what time ought this money to bee payd all at one payment?

Example.

Example.

1300	1300	1200	21664
650	650	1200	21664
600	650	1200	21664
3914	3914	3914	3914

months. *dayes.*

39 14 (5 6.
752

A Merchant hath owing unto him 781 pound, 12 ſhillings, to bee paid 1/3 at 4 moneths 1/2 at 7 moneths, the reſt at 11 moneths, what time muſt it be all at one payment.

Moneths.

Makes 6 moneths, 5:6 of a moneth.

Wines

Wines worth 14 pound ready money are sold for 16 pound, to pay 1:3 at 3 moneths, 1:2 at 4 moneths, and the rest which is 1:6 at 12 moneths; the question is, what is gained in 100 pound in 12 moneths.

	moneths.		
1:3	3	1	0:0
1:2	4	2	0:0
1:6	12	2	0:0
		5	0:0

Makes at 5 pound in the hundred.

Sugars worth 21 pound ready money are sold for 25 pound, to pay 1:5 ready money, 1:8 at 4 moneths, 3:10 at 7 moneths, 3:8 at 15 moneths; the question is, at what rate *per cent' per annum* they were sold.

	moneths.		
1: 8	4	0	1: 2
3:10	7	2	1:10
3: 8	15	5	5: 8
		8	9:40

Makes 8 pound 9:40 *per cent'*.

Allegation Mediall.

ALlegation is an Art teaching to combine or knit together divers things unequally prised, and thereby to find an equall price of any part of the said mixture. Allegation Mediall, is that which by the augmenting the quantity of every severall portion to be mixed by his owne price, and dividing the sum of all the Products by the totall of the severall portions to be mixed, findeth the thing sought.

Example.

Three severall sorts of Barley are to be mixed; *viz.* 34 bushels at 18 pence, and 76 at 20 pence, and 100 at 22 pence; the question is, what one bushell of that mixture will be worth? First, multiply each number by his price, *viz.* 34 by 18, 76 by 20, and 100 by 22, makes 612, 1520, and 2200, the Totall is 4332: then adde the number of bushells into one sum, makes 210; by which divide 4332 *d.* makes 20 pence, 132:210 of one penny for the price of one bushell so mixed

2 *Example*

2 Example.

If you will mixe 30 gallons of Sacke at 4 shillings a gallon, with 150 gallons of white Wine at 2 shillings the gallon, what will a gallon of that mixture bee worth? Multiply 30 by 4, makes 120 shillings; also 150 by 2 shillings, makes 300 shillings, Totall is 420 shillings: then adde 30 and 150, makes 180 Gallons; by which divide 420 shillings, makes 2 shillings, 1:3 of a shilling, or 2 shillings, 4 pence, for the price of one gallon so mixed.

3 Example.

Admit there were 6 portion of Silver of 7 ounces fine, 12 of 8 ounces fine, and 25 of 10 ounces fine, which are to be mingled with 10 pound of Copper, what is a pound of that mixture worth? For answer: multiply 6 by 7, makes 42; also 12 by 8 makes 96, and 25 by 10, makes 250, the totall is 388, which being divided by 53, the totall of 6, 12, 52 and 10 makes 7 ounces, 17:53 of an ounce; and so much fine is a pound of that mixture.

4 *Example.*

A Merchant hath 6 ſeverall ſorts of Spices, of which he will ſell, of each an equall quantity of ſeverall prices for the ſumme of 323 pound, 8 ſhillings: *viz.* Sinamond large at 4 ſhillings, 6 pence a pound; Nutmegs Caſe at 3 ſhillings, 8 pence a pound; Large Maces at 8 ſhillings a pound; and Pepper Caſe at 2 ſhillings 2 pence a pound, Pepper Callico at 22 pence the pound, and Ginger large at 10 pence a pound; the Queſtion is, how many pound he muſt have of each to make the juſt ſum of 323 pound, 8 ſhillings? Anſwer: firſt, put your money into ſhillings, makes 6468 ſhillings; ſecondly, put all your prices of the Spice into one ſumme, and by that ſumme, which is 21 ſhillings, divide 6468, makes 308 pound which he muſt ſell of each.

Example.

Example.

	s	*d.*
1	4.	6.
2	3.	8.
3	8.	0.
4	2.	2.
5	1.	10.
6	0.	10.
	21.	00.

	li.	*s.*	*d.*
1	69.	6.	0.
2	123.	4.	0.
3	56.	9	4.
4	33.	7.	4.
5	28.	4.	8.
6	12.	16.	8.
	323.	8.	0.

l.

6468(308

22222

22

Alligation Alternat.

ALligation Alternat is that, which altereth the places of such excesse as commonly fall betweene the meane price, and the extremes, in which counter-change, if the extremes be equall, then the difference betweene the meane price, & lesser extreme is to be set against the greater extreme, and of the contrary if otherwise.

1 Example.

White Wine of 20 pence the gallon is to bee mixed with Sacke of 3 shillings a gallon, so that there must be mixed 300 gallons to make the price to bee but 2 shillings, 4 pence the gallon, the question is, how much of each sort must bee taken. The numbers set downe, as in this example thus, the difference of 20 the lesser extreme from 28 is 8; also the difference of 36 the greater extreme is also 8, so that I find you must take as many of one sort, as of the other to make this mixture: *viz.* 150 gallons of each sort.

	d.	
28	36	8
	20	8

2 Example.

White Wine of 16 pence a gallon is to be mixed with Sacke of 40 pence the gallon, how many gallons must bee taken of either sort, so that 120 gallons may be of 30 pence the gallon.

The

The numbers being set downe, as in this example, the difference of 16 the lesser extreme from 30 the meane price, there will remaine 14, which I place against 40; then take the difference of 40, the greater extreme, from 30 the meane price, there will rest 10 to bee linked with the lesser extreme; whereby I find, that so often as I take 14 gallons of Sacke I must take 10 gallons of White Wine to make the mixture: wherefore if 24 gallons bee 120, what is

	40—	14
30		
	16—	10

14	70	
10	50	

3 Example.

A certaine Clothier is desirous to mingle 144 pound of Wooll of 4 sorts: *viz.* Blew wooll of 16 shillings the stone, red wooll of 11 shillings the stone, greene Wooll of 12 shillings, white Wooll of 9 shillings the stone, how many stones of each shall he take, that one stone of the mixture may be worth 14 shillings.

The counter-change being made, according to the Rule, as is in the Margent, it is plaine, that so often as you take 5 of Blew, you must take 3 of Greene, and 2 of Red, and 2 of White. Therefore if 12 bee 144, what

14	16.	5
	12.	3
	11.	2
	9.	2

is	5.	10
	3.	36
	2.	24
	2.	24

The end of the first Booke.

THE SECOND BOOKE.

Contayning a Treatise of Decimall Arithmatick:

Wherein is taught how to work all manner of operations in De-cimall *Arithmatick, more speedy and* easie; then by vulgar Arithma-tick; *and first of the Decimall* Table.

LONDON,
Printed by *Augustine Mathewes*, and are to be sold by *Robert Milborne* at the signe of the Grayhound in Pauls Church-yard. 1631.

THE VSE OF THE Decimall Table.

THe Decimall Table following doth begin from one Farthing unto a Prime, or two Shillings: ſo that if you have a Decimall Fraction given, which doth containe 90625 ſixths: ſearch it in the Decimall Table, and you ſhal find it over againſt 21 pence, three farthings, and that is the value of that fraction given.

Or if you would know how to ſet out 16 pence halfe-penny in Decimalls, ſearch in the Table againſt 16 *d.* 2. *q.* and you ſhall find 6875 fifthes for the Decimall ſought.

But if you would ſet out any number of ſhillings from one ſhilling unto one pound, or 20 ſhillings; ſearch in this little Table following, and you ſhall find your deſire. As if you would ſet out 15 ſhillings in Decimalls, you ſhall find 7 primes, 5 ſeconds for 15 ſhillings, and ſo of any other ſumme, as in the example following.

Example.

Shill.	1.2
1	05
2	10
3	15
4	20
5	25
6	30
7	35
8	40
9	45
10	50
11	55
12	60
13	65
14	70
15	75
16	80
17	85
18	90
19	95
20	1 *li.*

The

q.	1.2.3.4.5.6.7	q.	1.2.3.4.5.6.7
1	0010416	6	025
2	0020833	1	0260146
3	0031125	2	0270833
		3	0281125
1	0041666	7	0291666
1	0052083	1	0302083
2	006225	2	03125
3	0072916	3	0322916
2	0083333	8	0333333
1	009375	1	034375
2	0104166	2	0354166
3	0114583	3	0364583
3	0125	9	0375
1	0135416	1	0385416
2	0145833	2	0395833
3	015625	3	040625
4	0165666	10	0416666
1	0177082	1	0427082
2	01875	2	04375
3	0197916	3	0447916
5	0208333	11	0458333
1	0218746	1	046875
2	0229166	2	0479166
3	0239582	3	0489584
6	025	12	05

The Decimall Table.

q.	1.2.3.4.5.6.7	q.	1.2.3.4.5.6.7
12	05	18	075
1	0510416	1	0760146
2	0520833	2	0770833
3	053125	3	078125
13	0541666	19	0791666
1	0552083	1	0802083
2	05625	2	08125
3	0572916	3	0822916
14	0583333	20	0833333
1	059375	1	084375
2	0604166	2	0854166
3	0614583	3	0864583
15	0625	21	0875
1	0635416	1	0885416
2	0645833	2	0895833
3	065625	3	090625
16	0666666	22	0916666
1	0677082	1	0927082
2	06875	2	09375
3	0697916	3	0947916
17	0708333	23	0958333
1	0718746	1	096875
2	0729166	2	0979166
3	0739582	3	0989584
18	075	24	1000000

THE SECOND BOOKE, CONTAINING A TREATISE of Decimall Arithmatick.

The declaration of the parts of the Decimall Table.

FIrst, the Decimall Table in the left Margent containes certaine numbers in great and small letters; first, from one farthing unto one prime, or tenth of a pound, or 2 shillings. Then from one prime for every shilling unto one pound starling, or 20 shillings.

First, beginning in the left margent is set downe one farthing in the uttermost paralell to the left hand, in the first paralell of the Table, and so continuing from 1 farthing to one

one prime, or 2 shillings; and over against every number on the left side in a right line towards the right hand is contained the numbers in decimals, answering unto every farthing from one farthing to 1 prime, or 2 shillings; and in the upper margent in the head of the Table is contained, the true denominations of the said are all numbers in primes, seconds, thirds, fourths, fifths, sixths, and sevenths, which are small enough to worke any question exact to a small fraction of one penny in a sum of great value, as shall appeare by examples following. But heere you shall note, that all the numbers in the said Table cannot be exact and perfit.

To find the value of a Decimall fraction in the parts of Coyne.

Suppose the number given to be 2 seconds, 4 thirds, 5 fourths, and 7 fifths, and you desire to know the true value thereof in coyne; set downe your numbers, as in the example following, and marke your prime line, and then multiply the fraction by 240, the pence in one pound, and the numbers that arise by multiplication over the prime line are the sum of pence, the value of that fraction given,

ven, and the remainer on the right hand of the prime line is the fraction of one penny.

Example.

1.2.3.4.5.
02457
240
90280
4 | 914
pence. 5 | 82080

82080:100000 of a *d.*

Heere by multiplication of 2457 fifthes by 240 pence, I find 5 pence is gone over the prime line, and there remaines 82080:100000 parts of one penny. Now to know the value of that fraction in farthings, multiply the same by 4, and so many as goe over the prime line, are farthings, the rest is the fraction of a farthing.

Example.

82080
q. | 4
3 | 28320

Numeration

Numeration in Decimals.

If you have a number to bee expreſſed in Decimals of money, or Coyne ſterling, learne firſt by the Decimall Table how to expreſſe your Coyne, from one penny unto one pound ſterling, or from 1 farthing to 1 pound ſterling, for which the Table going before was calculated. If you would know the manner how to calculate the ſaid Table; divide one pound, adding 7 cyphers unto it, by your part you would know how to ſet forth in Decimals: as if you would know how a farthing will ſtand in Decimals; divide 1 pound with cyphers by 960, the number of farthings in 1 pound ſterling, and the quotient will be the numbers in decimals, ſignifying 1 farthing.

Example.

```
        6
    42644 . . . . 7
  10000000 (10416
   9606660
     9999
```

So that I find, that dividing of 1 pound by 960 farthings, the Quotient is 1 third, 0 fourth, 4 fifths, 1 ſixth, and 6 ſeventhſ: for if you

you ſhould have proceeded, adding more Cyphers, the Quotient would have been alwaies 6, becauſe I ſee the number remaining to bee the ſame it was at the laſt, that is 64. And although a farthing cannot bee ſet out exact in Decimals, yet it will ſerue in Multiplication and Diuiſion: for in 10000 yards or ells, it will not differ 1 penny, as ſhal appeare afterwards by examples in their places.

How to ſet out a penny in Decimalls.

Divide 1 penny with cyphers by 240, the number of pence in 1 pound ſterling, and the quotient will be a penny in decimals.

2 Example.

```
  2 2
  4 6 0          3.4.5.6.7.
2 0 0 0 0 0 0 0 (4 1 6 6 6
  2 4 4 4    0
    2 2
```

Here ſeeing that after I find the firſt quotient 6, and the remainer 16, as before I ceaſe Diuiſion, as needleſſe any further, knowing it will produce 6 in the Quotient infinitely, and therefore I put as many times 6 in the quotient, as I find expedient and needful, and 1 penny ſtands thus:

3.4.5.6.7.

3.4.5.6.7.
41666

And these and divers other numbers will not bee set exact in Decimalls, but yet they will serue to great purpose and exactnesse in a multitude of questions, in saving an infinite labour in Reduction, and Multiplication and Division.

How to breake a pound into his exact parts.

Set downe 1 pound thus, 10; then take the tenth, which is one prime, or 2 shillings, which I note thus, 1 I

Then take half of that prime or 2 shillings, saying the 1 halfe of 10 is 5, or the one halfe of one prime is 5 seconds, or 1 shilling; then the one halfe of 5 seconds is 2 seconds, and 5 thirds, saying, the 1 halfe of 5 seconds, is two seconds, and 5 thirds, which is 6 pence: then halfe of 2 seconds, 5 seconds, is one second, 2 thirds, 5 fourths, which doth represent 3 pence in Decimals. Againe, one halfe of 1 second, 2 thirds, 5 fourths, is 6 thirds, 2 fourths, 5 fifths, representing 1 penny, halfe-penny, or 3 halfe pence. Againe, halfe of that number is 3125, or 3 thirds, 1 fourth, 2 fifths, 5 sixths; signi-

ſignifying 3 farthings in Decimalls, behold the worke.

Example.

2 *s.*	1 *s.*	6 *d.*	3 *d.*
l. 1	2 50	2.3 25	2.3.4
10 10	5 25	25 1 25	1 25
1 5			

1 *d. ob.*	or 3 *farthings.*
1 25	3.4.5 6 25	3.4.5.6
6 25	6 25	3 1 25	3 1 25

It is alſo very neceſſary to underſtand the proportionall parts of a pound, for by them are many queſtions ſpeedily wrought in Decimalls, as ſhall appeare in the examples of Multiplication and Diviſion afterwards.

How to expreſſe the value of any number in Decimalls.

Admit for example this number following, is to bee expreſſed according to the computation of Decimall Arithmatick, *viz.* 3785725 thirds: then for the expreſſing the ſignification of that number in the knowne parts of Coyne, firſt, marke out your

your prime line, to distinguish the whole Numbers from the Fractions with a right downe stroke with the pence, and then you shall find the numbers to stand thus 3785 pound, 7 primes, 2 seconds, and 5 thirds; which search in your Decimall Table, and it doth signifie 14 shillings, 6 pence; so that the whole number is 3794 pound, 14 shillings, 6 pence, and so of all numbers for you shall understand, that every prime doth signifie in value 2 shillings, every second 2 pence and 2:5 parts of 1 penny, and every 5 thirds 1 penny, and 1:5 of one penny: or elles every prime is 1:10 of 1 pound; eve y second 1:100 part of 1 pound, and every third 1:1000 part of 1 pound, &c. infinitely.

How to remoove a Decimall number from one place to another.

If you have a Decimall number given: as for example, 3 pence, which doth thus stand in Decimalls, 1 second, 2 thirds, 5 fourths; then you desire to know how it will stand in the place of primes, pounds, or in the place of 10 *l.* or hundreds or thousands. Remove it one place toward the left hand, and it is 1 prime, 2 seconds, 5 thirds, or in knowne parts of coyne 2 shillings, 6 pence. Againe,

remoove

remoove them one place more towards the left hand, and it will be 1 pound, 2 primes, 5 seconds, or 1 pound, 5 shillings. Againe remoove one place more: and it is 12 pound, 19 shillings: Againe, remoove it one place more, and all your fractions are in whole numbers, and will signifie 125 pound, &c.

2 s. 6 d.	*1 l 5 s.*	*12 l. 10 s.*
4		
| 1250	1|2500	12|5000

l.	*l.*	*l.*
125|0000		1250|0000

l.

1250 0\|0000

And this Rule is very necessary to be well and perfectly understood, for by it any price be given of a unite in Decimalls, you may speedily know what 100, or 1000, or 100 0 will cost at that rate, onely by adding of one, two, or more Cyphers.

As for example, if one ell cost 6 shillings 3 pence, what will 100 ells cost at that rate? first, set out your price in Decimals thus, 3 primes, 1 second, 2 thirds, 5 fourths, and adding of 2 Cyphers, because 100 hath 2 Cyphers,

phers, the sum will be 31|2500: and because your fractions were fourths, cut off 4 figures and Cyphers towards the right hand, or marke your prime line, and you shall find, that 100 ells will cost 31 pound, 5 shillings at that rate.

1 *Example.*

l.	1. 2. .
31	2500

If the numbers of the price given will not be exactly set downe in Decimalls: as for example, at 7 pence, 3 farthings a yard, what will 100 yards cost? Set downe your price as neere as may be, by your Decimall Table, which is 3229: sevenths, add unto it two cyphers, makes 322900, and because your fractions are sevenths, cut off 7 figures, and there will be 3 pound, 4 shillings, 7 pence.

2 *Example.*

l.	1.2.3.4.5.6.7
3	2291600

And thus much shall suffice for Numeration in Decimalls, and I will now proceede unto the second Rule of Arithmatick, *viz.* Addition in Decimals.

CHAP.

CHAP. II.

Addition in Decimals of Coyne.

IF you have divers severall numbers given in Decimalls to bee added together into one summe, place them in order every one right under his like denomination, or kind, Integers under Integers, Primes under Primes, Seconds under seconds, &c. Then begin your Addition at the right hand at the least Denomination first, and adde them all according to the Rule of Addition, as if they were all whole numbers, alwaies having a care to marke out your prime line, and the totall of your Addition will shew you the just value of those whole numbers and fractions.

1 *Exampl.*

Integers	1.	2.	3.	4.	5.
3576	7	2	5	0	0
2400	0	3	2	5	0
7206	5	1	2	5	7
3278	6	3	7	5	6
16451	9	0	7	6	3

Totall is 16451 l. 18 s. 1 d. 39.

	li.	s.	d.	q
Here the first number is	3176	14.	6.	0
The second number is	2400.	00.	7.	3
The third number is	7206.	10.	3.	0
The fourth number is	3278.	12.	9.	0
The totall sum is	16461.	18.	1.	3

CHAP. III.

Subtraction in Decimalls.

IF you have two numbers in Decimals, the one to be subtracted from the other, place them above one the other, as in Addition, the greater numbers in the upper part, and the smaller numbers right underneath, and then subtract them as if they were whole numbers, and note downe the remayners each in their proper places, as in this example.

1 Example.

	li.	1.2345
Lent.	78569	78563
Paid.	69587	06250
Rest.	8982	72313

li. s. d.

8982. 14. 5. ½

Proofe. 78569 | 78563

The

	li.	s.	d.	d.
The proofe, Lent.	78569.	15.	8	1:2
Payd.	69587.	1.	3	0:0
	8982.	14.	5	1:2

2 Example.

	l.	1.2.3.4.5
Lent.	38057	32567
Paid.	29730	96254
Reſt.	8326	36313
Proſe.	38057	32567

The proofe in Coyne.

	l.	s.	d.
Lent.	38057.	6.	6
Paid.	29730.	19.	3
Reſt.	8326.	7.	3
Proofe.	38057.	6.	6

CHAP. IV.

Multiplication in Decimalls.

IF you have any two numbers given to be multiplyed in decimals, place your multiplicand uppermoſt, and your multiplier right under-neath, as if the ſame were abſolute whole numbers, and no fractions at all; and when your numbers are placed, marke how many fractions your two numbers doe containe, and note that number downe, and multiply according to any of my former inſtructions in the firſt booke; and when the product is gathered, cut off your prime line, juſt ſo many figures and Cyphers, as your multiplicand and multiplier had fractions between them, and the worke is ended.

Example.

If you will multiply 758|325 thirds, by 385|7 primes, I place firſt my numbers, and then I find my multiplicand to have 3 fractions, to wit, primes, ſeconds and thirds, and I find

find my multiplier to have one fraction, onely primes, which makes 4 fractions, and so many figures I cut of from the Product.

Example.

1.2.3.
75 8 3 2 5
3 8 5 7

5 3 0 8 2 7 5
3 7 9 1 6 2 5
6 0 6 6 6 9 0
2 2 7 4 9 7 5

2 9 2 4 8 5 | 9 5 3 9

2 Example.

If you will multiply 34 pound, 5 shillings 3 pence, by 16 pound, 6 shillings, 6 pence, set them in Decimals, 34|2625 fourths, by 16|325 thirds, and multiply them together, and cut from the Product 7 figures to the right hand, and the Product will bee 559 pound, 6 shillings, 8 pence *ob.* almost.

Example.

1.2.3.4
3 4 2 6 2 5
1 6 3 2 5

1 7 1 3 1 2 5
6 8 5 2 5 0
1 0 2 7 8 7 5
2 0 5 5 7 5 0
3 4 2 6 2 5

5 5 9 3 5 3 1 2 5

3 Example.

If you will multiply 7 5 8 Integers by 3 primes, 7 seconds, 5 thirds, which is by 7 shillings, 6 pence; place them as in the last example, and from the product cut off the 3 figures for the 3 fractions, and the totall is 284 pound, 5 shillings, the sum that 758 ells will cost at 7 shillings, 6 pence an ell, &c.

Example.

Example.

758
375

3790
5306
2274

284250

If you will multiply Fractions by Fractions in Decimals; as to multiply 5 primes, 2 seconds, 6 thirds, 3 fourths, by 7 primes, 2 seconds, 5 thirds; set them as before, and cut off 7 figures.

4 Examples.

1.2.3.4
5263
725

26315
10526
36841

Makes 7 *s.* 7 *d.* 66.

1381567 5

If you will multiply in Decimalls by 10, or by 100, or by 1000, &c. set downe your numbers, and marke how many Fractions there be in your multiplicand, and then adde so many Cyphers as your multiplyer hath to the right hand, and cut off your prime line, and the worke is ended, as in this example.

Example.

1.2.3.4.5.6

7|8 5 6 0 2 5

1 0 0

785 *l.* 12 *s.* 0 *d.*

7 8 5|6 0 2 5 0 0

How to change any fraction given into Decimalls.

Admit there be a Quotient of a Division, which is 358 pound, 126:255 of one pound, which fraction you would turne into Decimalls; adde a Cypher to your Numerator of your fraction, makes 1260: but because your number will not be evenly divided by your Denominator 255, therefore adde more Cyphers, and then divide the number by 255 makes 49411 fifths in Decimalls to bee joyned with the whole numbers 358|49411 fifthes, and are now fit for multiplication and division in Decimals.

5 *Example.*

2034
40505 1.2345
2000000 (49411
2525255
25255
222

Admit there be a fraction to be set out in Decimals thus, it is required to know what 156 yards of cloth will cost at 196:784 of a pound one yard? Adde to 156, 2, 3, or more Cyphers, and divide by the Denominator 784, makes 25 seconds, by which multiply 156 yards, makes 39 pound.

6 *Example.*

156 00
25 39200 (25
780 7844
312 7840
3900

7 *Example.*

For the proofe of this worke, multiply 156 by 196, makes 305763 which divided by 784, makes 39 pound, as before.

196
156

1176
980
196

30576

00
07560 l.
30576(39 the proof.
7844
78

CHAP. V.

Division in Decimalls.

IF you will divide any numbers in Decimals, either whole numbers by Fractions, or fractions by whole numbers, or whole numbers & fractions by whole numbers and fractions; set them downe according to the Rules in Decimalls in the operations before going. As for example, a certaine Merchant bought as much cloath as cost him 284 pound, 5 shillings, at 7 shillings, 6 pence an ell, the question is, how many ells he had for his money? To do this, or any other the like question; divide your summe of money 284 pound, 5 shillings by 7 shillings, 6 pence, and the Quotient will shew you, what number

of

of elles, and parts of an ell, if any be, were bought for that money.

1 Example.

0
300
21790 *Elles;*
28425 (75 8
27555
377
3

How to divide the ſmaller number by the greater.

If you will divide 34 pound, 6 ſhillings amongſt 36 men: place your numbers, adding, 3, or 4, or 5 cyphers; and then divide by 36, makes 95271 fifths; or in Coyne 19 ſhillings, 0 pence, *ob.* for every mans portion.

2 Example.

2232
29088 1.2.3.4.5
3430000(95271, or 19 *s.* 0 *d.* *ob.* 1:4
36660
333

What is the quotient of 724 pound? Divided by 3:4 of a unit, or 15 ſhillings? Anſwer: divide 724 by 75 ſeconds, makes 965

1;3;

1:3; for triall whereof multiply 965 1:3 by 15 shillings, or 75 seconds, makes 724, as in the example.

2 *Example.*

422		
49085	1.2.3	
724000 (965|333	or 965	1:3
75555	75	
777		
	4825	
	67555	
	2	
The Proofe.	724|00	

This last Question is in effect no other but as the former: for if I shall say, a Merchant buyes Broad-Cloth, costs him 724 pound at 15 shillings, or 3:4 of a pound one yard, the Question is, what number he had for his money, and by division I find he had 965 yards, and 1 third part of a yard, as is proved in the example; and so dividing 724 by 3:4 the quotient is 965, 1:3

3 *Example.*

If you will divide the Product of the second example in multiplication, which was 259|3353|125 sevenths by 10|325 for the proofe

proofe of that worke, which ought to bring out the multiplicand 34|2625; or rather if you will divide 559 pound, 6 shillings, 8 pence, *ob.* almost, by 16 pound, 6 shillings, 6 pence, the quotient will be 34 pound, 5 shillings, 3 pence.

Example.

	2	0 4 8	
	4	2 2 0 1	
Divisor.	69	5 8 0 8 6	*l.* 1. 2. 3. 4

16|325	5 5 9	3 3 5 3 1 2 5	(34	2625
	0 0 0	0 0 0 0 0 0 0		
	4 8 9	7 5 0 0 0 0 5		
	6 5	3 0 5 5 5 2		
	3	2 0 9 6 6		
		9 7 2 1		
		3 8		
The	5 5 9	3 3 5 3 1 2 5	*proofe.*	

How to find the prime line in any Division decimall, or to find the true denomination of the Quotient.

In any Division decimall, alwayes marke out

out your prime line in your Dividend with a ſtreight downe line with the pen, then ſet your Decimall fractions in primes, ſecounds, thirds, fourths, &c. beyond the line; alſo doe the like in your diviſor, and then marke how often you may remove your diviſor, that the whole numbers of your Diviſor may ſtand under the whole numbers of your dividend, and ſo many figures ſhall your quotient have in whole numbers, the reſt are to be marked with prickes in the quotient for primes, ſecounds, thirds, &c.

If you will divide 93 8161375 fifthes by 34 pound 35 ſecounds, then place them with pricks, as in the example following. I find having placed my diviſor underneath my dividend, that I may remove my diviſor twice under the whole numbers of my Dividend, and therefore I conclude the firſt 2 numbers of my quotient will bee whole numbers, which I marke from the reſt of the numbers in the quotient with a line, and then dividing according to the former inſtruction, you ſhall find the quotient will be 27 pound, 3 primes, 2 ſecounds, and 5 thirds.

Example.

Example.

27
2 2 8 3 2
2 5 2 2 6 8 *li.* 1. 2. 3 *l.* *s.* *d.*
9 3 8 6 2 7 8 5 (2 7 3 2 5 or 27, 6, 6
3 4 3 5 5 5 5 5
3 4 3 3 3 3
3 4 4 4
3 3

2 Example.

If you would divide 15554 pound, 5 primes, 5 seconds, or 5 shillings, by 45 pound? Place them as in the Example following, and you shall find, that there will bee in the quotient 3 figures in whole numbers, and the rest will be primes and seconds, so that dividing of 15554 pound, 5 primes by 45 pound, the quotient is 345 pound, 13 shillings.

Example.

2 2
2 0 2 9 *l.* 1. 2 *l.*
4 5 5 5 5 4 5 9 (3 4 5 | 6 5 or 3 4 5 13
4 5 5 5 5
4 4 4 4

3 *Example.*

3 *Example.*

If the greateſt number of your Diviſor be primes, then the figures of your whole numbers in the Quotient will be, once greater in value, then the times you can remoove your Diviſor, as if you would divide 241 pound, 5 primes, by 7 primes: then whereas you can remoove your diviſor by two times under the whole numbers 241, yet you ſhall have 3 numbers in the quotient in whole numbers, becauſe your firſt figure of your Diviſor is primes; ſo that in dividing 241 pound, 5 primes by 7 primes, I find the quotient will bee 345 pound, or integers; and ſo many yards, at 14 ſhillings a yard, which is 7 primes, will 241 pound, 10 ſhillings buy.

Example.

33 yards or pounds,

7 2 5 (3 4 5

7 7

4 *Example.*

If you will divide 16 pound, 875 thirds, which is 16 pound, 17 ſhillings, 6 pence by 375 thirds, which is 7 ſhillings, 6 pence, or which is all one, imagine there is as much cloth of 7 ſhillings, 6 pence a yard, as coſt 16 pound,

pound, 17 shillings, 6 pence; the question is, how many yards was bought for that money? placing your numbers in the example following, I find 45 yards is the answere to the question.

Example.

£	*yards.*
26|875	(45
3755	
37	

Example.

If you will divide whole numbers and fractions by whole numbers, place the whole numbers and fractions uppermost, and marke out your prime line, and then set your Divisor under-neath, and the lowest figure in valew of your Divisor, will shew you what is the denomination of the first figure of your Quotient. As if you will divide 13 pound 95 seconds by 45; or which is all one if you shall say; if 45 pieces of figges cost mee 16 pound, 19 shillings, what did one piece cost? Divide 13\|95 seconds by 45, makes 31 seconds, or 6 shillings, 2 pence, 2:5 of a penny for the price of one piece. And in this sort the price of any number of yards, elles, or pounds

pounds being given in dividing it by the number of yards, ells, or pounds, the quotient will bee the price of one; and by this Rule you save a labour of Reduction, alwayes dividing the price by the number given, the greater by the lesser, or the lesser by the greater.

Example.

4	l.	2	s.	d.	d.
23|65	(3	2	or 6	2	2|5
459					
4					

6 Example.

If 456 elles of cloth cost 575 pound, 7 primes, what will one ell cost? divide 575 pound, 7 primes by 456 elles; makes 1 pound 2625 fourths, or in Coyne, 1 pound, 5 shillings, 3 pence for the price of one ell.

2				
3822				
3229548	l. 1.2.3.4	l.	s.	d.
5757000	(12625	or 1.	5	3
4566668				
45555				
444				

Reduction

Reduction in Decimalls.

If you will reduce 75 pound, 12 shillings, 9 pence into Decimals, enter your Decimall Table, and for 12 shillings find 6 primes; then looke for 9 pence, and you shall find 375 fourths; so the totall is 75 pound, 6:75 fourths, and are now fit and apt for any Decimall operation.

If you multiply or divide 84 pound; 13 shillings, 6 pence, by 17 pound, 3 shillings, reduce them into Decimalls by the Table, makes for 84 pound, 13 shillings, 6 pence 84:675, and for 17 pound, 3 shillings, 17:15, and are now fit to bee multiplied or divided one by the other.

If you will reduce 189:756 parts of one pound into Decimals: divide 189, adding 3 Cyphers to it by 756 makes 25 seconds for that Fraction in Decimalls: and now for example, If 158 elles of Cloth and 189:756 parts of an elle cost 79 pound, 2 shilling, 6 pence, what will 640 elles cost at that rate? Now according to vulgar Arithmatick, either I must reduce 158 ells 189:756 parts of an elle into 756 parts, or otherwise I must

Reduce

Reduce the fraction into his least termes, makes 1:4; then I multiply or reduce 158 ells into fourths, makes 633 fourths for the first number in the Golden Rule. Secondly, reduce 79 pound, 2 shilling, 6 pence into pence, makes 18990 pence for the second number; then put 640 elles into fourths, makes 2560 fourths; then multiply 18990 by 2560, makes 48614400; which divide by 633, makes 320 pound.

Example.

```
                                  l.
  90
 4206          4
48624400 (76800 (320
 6333333      24440
  63333       22
   666
```

The same example wrought by Decimalls.

If 158 ells 1:4 ell cost 79 pound, 2 shilling, 6 pence, what will 640 ells cost at that rate? Place them in Decimalls thus; If 15825 seconds cost 79|125 thirds, what 640 elles? Multiply 79|125 thirds by 640, makes 50640|000; which divide by 15825, makes 320 pound the quotient.

Example.

Example.

1.2.3

79 | 125
640

3165 | 000
47475 | 0

50640 | 000

3295 l.
50640000 (320
2582555
25822
258

Or otherwise.

Divide 15825 by 79125, adding one cypher, makes 2 primes for the Quotient; wherefore I conclude, that one halfe of 640 pound, which is 320 pound, is the answer to the question demanded. Also divide 79125 by 15825, the quotient is 5 primes; by which multiply 640 pound, makes 320 pound for the answere to the question as before.

If a Phillips Dollar bee worth 4 shillings, 8 pence, what are 465342 Dollars worth in sterling money? Answere multiply 465342 by 2 primes, which is 4 shillings, & take the sixth part of that product, and adde into it, makes 1085798 primes for the answer.

Or otherwise, multiply by 2 primes, and 1:3 of a prime, because 8 pence is 1:3 of a prime, and both wayes will produce the same answere.

Example.

Example.

465342	2	1:6	465342	2	1:3
930684			930684		
155111/4			155111/4		
1085798			1085798		

If a common Dollar be worth 4 shillings, and a Princes Dollar be worth 4 shillings, 6 pence, how many Princes Dollars will pay for 7584 common Dollars? Multiply 7584 by 4 shillings, and divide by 4 shillings, 6 pence, makes 6741 Dollars, and 7 seconds, and 5 thirds wil remaine, which is 18 pence; so that I conclude, 6741 Princes Dollars at 4 shillings, 6 pence a piece will pay for 7584 common Dollars, and there will remaine 18 pence.

7584	2	1516/8

Example.

2093775	*Dollars.*	2.3
2516800	(6741	75
2255555		
2222		
22		

In 654 pound, how many Dollars of 3 shillings

lings a piece? Adde two Cyphers to 654, makes 65400, because 3 shillings hath 2 fractions in Decimals, *viz.* primes and seconds, which is 8 prime and 5 seconds, by which divide 65400, makes 4360 Dollars at 3 shillings a piece.

Example.

```
        0        1. Dollars.
  65400 (4360
  25555
   2222
```

In 756 pound how many Dollars of 3 shillings, 9 pence a piece? Adde 4 Cyphers to 756, makes 7560000; which divide by 1875, which is 3 shillings 9 pence in Decimals, makes 4032 Dollars. Behold the example following.

Example.

```
      3375   Dollars.
  7560000 (4032
  2875555
   218777
    2188
       2
```

If I doe sell 346 yards of Velvet for 198 pound, 8 shillings, 6 pence; how doe I sell one

Example.

465342	2	1:6	465342	2	1:3
930684			930684		
155114			155114		
1085798			1085798		

If a common Dollar be worth 4 shillings, and a Princes Dollar be worth 4 shillings, 6 pence; how many Princes Dollars will pay for 7584 common Dollars? Multiply 7584 by 4 shillings, and divide by 4 shillings, 6 pence, makes 6741 Dollars, and 7 seconds, and 5 thirds wil remaine, which is 18 pence; so that I conclude, 6741 Princes Dollars at 4 shillings, 6 pence a piece will pay for 7584 common Dollars, and there will remaine 18 pence.

Example.

7584	2	1516	8	269375	Dollars. 2.3
				2516800	(6741 75
				225555	
				2222	
				22	

In 654 pound, how many Dollars of 3 shillings

lings a piece? Adde two Cyphers to 654, makes 65400, becauſe 3 ſhillings hath 2 fractions in Decimals, *viz.* primes and ſeconds, which is 8 prime and 5 ſeconds, by which divide 65400, makes 4360 Dollars at 3 ſhillings a piece.

Example.

1. *Dollars.*

65400 (4360
29555
2222

In 756 pound how many Dollars of 3 ſhillings, 9 pence a piece? Adde 4 Cyphers to 756, makes 7560000; which divide by 1875, which is 3 ſhillings 9 pence in Decimals, makes 4032 Dollars. Behold the example following.

Example.

1875 *Dollars.*

7560000 (4032
28755555
28777
288
2

If I doe ſell 346 yards of Velvet for 198 pound, 8 ſhillings, 6 pence; how doe I ſell

one

one yard? Answere: divide the price by the quantity of yards in decimals, makes 1625 fourths, or in Coyne 17 shillings, 3 pence for the price of one yard.

Example.

1
87
21663 1.2.3.4
2884250 (8625
246666
3444
33

Makes 17 *s.* 3 *d.* a yard.

A Merchant would buy severall sorts of Spices of severall prices, to wit, of 3 shillings a pound, of 2 shillings, of 2 shillings 3 pence, of 1 shilling 7 pence, and of 2 shillings, 2 pence a pound, and would have of each a like quantity; for 324 pound, the Question is, how many pound hee must have of each? First, adde all the prices into one sum, makes 11 shillings by which divide 324 pound, makes 584 pound, 1:11 of a pound, and so many pound must he have of each sort.

A Goldsmith sent his servant to the Tower of London, to fetch him 415 pound, 18 shillings, 9 pence in pieces of 6 pence, of 4 pence,

pence, of 3 pence, of 2 pence, of 1 penny, and of 1 halfe-penny, and bad him bring of each sort a like quantity: First, adde all your Coyne, makes 16 pence halfe-penny, which in Decimalls is 6875 fifths; by which divide 41593750 fourths, makes 6050 pieces of each sort.

Example.

24

41593750 (6050 pieces of each sort.
6875555
68777
6888

Rules of Practice in Decimalls.

Set your price given in the Decimall Table of a vnite, bee it yard, ell, piece, or pound, and by the price given, multiply the number of yards, elles, pieces, or pounds, and the Product will bee the sum that you seeke, if you doe but marke out the prime line, as shall appeare by examples following.

Example.

If one pound weight of small Ginger cost

7 pence halfe-penny, what will 112 pound waight coſt? I find for 7 pence halfe-penny 3125 fifths, which multiply by 112 pound, makes 350000; from which cut off fiue figures to the right hand by the prime line, and the ſumme is 3 pound, 5 primes, or 3 pound, 10 ſhillings, becauſe your multiplicand hath 5 fractions.

Example.

2.3.4.5
3125
112

6250
3125
3125

350000

1.2.3.4
171|2500

makes 171 *l.* 5 *s.*

How to find the price of any unite in any place of 10, *or* 100, *or* 1000, *the price of one being given.*

If the price of a unite be given at any rate, and from thence you deſire to know, what 10, or 100, or 1000, or 10000 will coſt at that rate:

rate? or otherwise, if you desire to know, if you doe gaine any rate desired by the pound, and would know at what rate it will bee in the 100 pound, or upon exchange from place to place, the exchange of one pound being given, you desire to know, what 100 pound will amount unto? Place your rate or gaines given in Decimalls by helpe of the table, and then adding of one, two, three, or more Cyphers, cutting off your prime line, you shall know your desire, marking the denominations of your fractions, if the least to the left hand be primes, seconds, thirds, fourths, fifthes, cutting off your prime line so many figures from the right hand.

2 Example.

If one pound sterling be 1 pound, 14 shillings, 3 pence Flemish, what is 100 pound sterling worth? Place 1 pound, 14 shillings, 3 pence in decimalls, makes 1,7125 fourths: then because 100 pound hath two Cyphers, makes 171,2500: then cutting off 4 figures to the right hand, you shall find 171 pound, 5 shillings for 100 pound sterling, to make as appeareth before.

If one ell of Cambrick cost 7 shillings, 6 pence, 3 farthings, what will 100 ells cost at that rate? Place 7 shillings, 6 pence, 3 farthings in Decimalls, makes 378125 sixths and adding two Cyphers for 100, makes 37812500: from which cut off 6 figures on the right hand, makes 37 pound, 16 shillings 3 pence for the sum that 100 elles will cost.

3 *Example.*

1.2.3.4.5.6

37|812500

Makes 37 *l.* 16 *s.* 3 *d.*

4 *Example.*

1112|5000

If one pound or piece cost 1 pound, 2 shillings, 3 pence, what will 1000 pieces cost? Set 1 *d.* 2 *s.* three pence, in Decimalls makes 1125 fourths: to the which adde Cyphers, because 1000 hath 3 Cyphers, and from the totall cut off 4 figures, makes 1112 pound, 10 shillings, as is in the 4 example above.

If one ell of Holland cost 3 shillings, 3 pence, what will 343 elles cost? Multiply 343 by 3 shillings, 3 pence in Decimalls, which is 1625 fourths, makes 55 pound, 14 shillings, 9 pence.

5 *Example.*

5 Example.

		1	2	3.4
8		21	6	5
		3	4	3
	4	5	7	5
6		5	0	0
48		7	5	
55	7	3	7	5

6 Example.

			12	3
		9	7	2
		7	7	5
		4	8	6 0
	6	8	0	4
6	8	0	4	
7	5	3	3	0 0

If one yard of Velvet cost 15 shillings, 6 pence, what will 972 yards cost? Find for 15 shillings 75 seconds; then for 6 pence find 25 thirds, totall is 775 thirds; by which multiply 972, makes 753 pound, 6 shillings, as above in the sixth example.

If one yard of Velvet cost 17 s. 7 d. 3 q. what will 857 yards cost? First, find 17 s. to be 85 seconds, then 7 d. 3 q. makes 3 2 2 9 1 6, totall is 8 8 2 2 9 1 6; which multiply by 8 5 7, makes 756 l. 2 s. 5 d. 3 q.

7. Example.							8 Example.			
1	2.	3.	4.	5.	6.	7	1.	2.	3.	4
	8	8	2	2	9	1 6		2	3	7 5
				8	5	7			7	5 8
6	1	7	6	0	4	1 2	1	9	0	0 0
44	1	1	4	5	8	0	11	8	7	5
705	8	3	3	2	8		166	3	5	
756	1	2	3	9	0	1 2	180	0	2	5 0

If one Dollar be worth 4 ſhillings, 9 pence what are 758 Dollars worth in ſterling money? Multiply 4 ſhillings 9 pence, which is 2375 fourths by 758, makes 180 pound, 6 pence, as in the eighth example above.

The price of any number of yards, elles, pieces, or pounds given to find the price of a unite.

If the price of any number of yards, elles, pieces, or pounds be given, ſet them downe in Decimals adding, 1, 2, or more Cyphers, if need requires, and divide that ſum, or price by the number of the yards, elles, pounds, or pieces, and the quotient is the price of a unite in whole numbers, primes, ſeconds, & thirds, without reduction, as ſhall appeare by examples

ples following: and in this manner you may know what sum of money was lent, if the principall and intereſt be given at any rate in the hundred; or you may know if the rate of one pound exchange bee given for any place, you may know the value of 100 of that Coyne in that money given; and by this rule is to bee abbreviated almoſt all operations of Arithmatick, by finding the value of a unite in any place deſired.

If 542 ells of cloth coſt 22 pound 4 pence halfe-penny, what coſt 1 ell at that rate? divide 22501875 fifthes by 542, makes 40625 fixths, or in Coyne 9 pence 3 farthings for the price one ell coſt.

1 *Example.*

```
   227
  33392      23.4.5.6
22501875 (40625
 5422222
  54444
   999
```

If 345 pound gaine 76 pound, 12 ſhillings, what doth one pound gaine? Divide 76600000 by 345 pound, makes 222028 fixth, or in Coyne, makes 4 ſhillings, 5 pence

halfe penny almoſt, that 1 pound doth gaine as in the example following.

2 *Example.*

4 1 2
7 7 6 2
7 6 2 0 1 0 1.2.3.4.5.6
7 6 6 0 0 0 0 0 (2 2 2 0 2 8
3 4 5 5 5 5 5 2
3 4 4 4 4 4
3 3 3 3

If 756 pound, 3 quarters, 24 pound of ſugar coſt 4421 pound 12 ſhillings, what did one pound waight coſt, accounting 112 pound to the hundred? Reduce 756 pound 3 quarters, 24 pound into pounds ſuttle, accounting 112 pound to the hundred, makes 84780 pound; then divide 4421 pound, 12 ſhillings by 84780, makes 5215 fifths, or 12 pence, half-penny one pound.

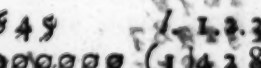
3 *Example.*

4 3 2
1 3 5 6 9
2 8 2 4 0 2 2 3 4 5
4 4 2 1 6 0 0 0 0 (5 2 1 5
8 4 7 8 8 8 0
8 4 7 7 7
8 4 4
8

If

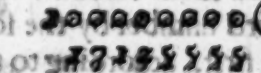
If I ſell 1000 pieces of Cambricke for 700 pound, how dear I ſell one piece? Divide 1000 by 70, makes 1 pound, 42857 fifths, 1 pound, 8 ſhillings, 6 pence, 3 farthings, as in the example following.

Example.



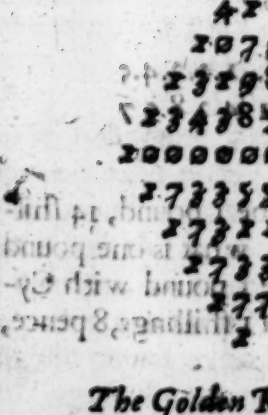
If one pound ſtarling be 1 pound, 14 ſhillings, 3 pence Flemiſh, what is one pound Flemiſh worth: Divide 1 pound with Cyphers by 17125, makes 11 ſhillings, 8 pence, 1 farthing almoſt.

Example.



If 1 *l.* sterling bee 1 *l.* 14 *s.* 7 *d.* ob. Flemish, what is 100 *l.* Flemish worth in sterling money? Divide 100 by 1|73125 fifths, which is 1 *l.* 14 *s.* 7 *d.* ob. in Decimals, makes 57 *l.* 15 *s.* 3 *d.*

6 Example.



The Golden Rule in Decimalls.

If the number given bee pounds, shillings and pence, set them out in Decimalls, and also your number of yards, elles, pieces, pounds or any other numbers, set them out also in Decimalls, and then without reduction, multiply the third number by the second, & divide by the first, according to the instructions of multiplication and Division in the former part of this booke, and the quotient will be the third number sought.

1 *Example.*

1 Example.

If 34 el's of Canvas coſt 1 pound, 4 ſhillings, what will 756 el coſt at that rate? Multiply 756 by 1 pound, 2 primes, makes 9072 primes; which divided by 34, adding Cyphers, makes 266823 fourth, or in Coine 26 pound, 13 ſhillings, 8 pence.

Example.

756	£ 1 2	*l.* 1.2.3.4
12	22788	(266823
1512	9072000	
756	3444444	
	33333	
9072		

If 112 pound of Indico coſt 34 pound, 17 ſhillings, what coſt 789 pound; ſubtil accounting 100 pound to the hundred? Multiply 3485 ſeconds by 789, makes 27495 pound, 65 ſeconds; which divided by 112 pound makes 245 pound, 5058 fourths, or 10 ſhillings, 1 penny farthing.

Example.

Example.

1.2
2485
789

		65	
		5016	69
31365		77496	6500
27880		22222	22222
24395		2222	222
		222	22

l. 1234
(245|5058

37496|65

If 981 elles of Cloath cost 94 pound, 13 shillings, 6 pence, what cost 2943 ells at that rate? Divide the third number by the first, & by the quotient multiply the second, and the product will be the answer sought.

1.2.3
94|675
2943 (3
283
3
4025

Makes 284 l. 16 d.

If 112 pound of Sugar cost 5 pound, 3 shillings, 9 pence, how many pounds will 124 pound

pound buy at that rate? Divide 5|1 875 fourths by 112 pound, to find the price of 1 pound, makes 46316, sixths, or in Coyne 11*d.* 1:10 of a penny almost for the price that one pound cost. Secondly, divide 124 pound by the price of one pound, *viz.* by 46316 sixths, makes 267713 primes, and so many pound he shall have for 124 pound.

If 1 yard Broad-Cloath cost 16 shillings, 9 pence, how many yards shall 56 pound buy at that rate? Divide 56 pound by 16 shillings, 9 pence, the price of 1 yard, makes 66 yards, 9:10 almost.

Example.

5
250
575000 *yards.* *yard.*
560000000 (66 86:100
83755555
8377777
8333
8

If 7 yards 1:2 of cloth cost 9 shillings, what will 8 yards 1:3 of a yard cost? Multiply 9 shillings, or 45 seconds by 8 1:3, makes 375, which divide by 7 yards 1|2, or by 715 primes, makes 5 primes, or 10 shillings.

Example.

1 *Example.*

4|5

8, 1:3

360 3750 (5, or 10

15 75

375

If 5 yards 1:2 coſt 4 ſhillings, 8 pence, 1:4 of a penny, or 56, 1:4, what will 30 yardes coſt at that rate? ſet your 56 pence 1:4 in Decimalls, makes 56|25 ſeconds, which multiply by 30, makes 1687|50 ſeconds; which divided by 5 yards one halfe, or 5|5 primes, makes 306 pence 8:10 of one penny for the price of 30 yards, as in the example following.

Example.

56|25	2341|1		*d.*	*l.*
30	26875|0	(306	8.	
1687|50	5555			
	555			

or 25 *s.* 6 *d.* 4|5 of 1 *d.*

If 34 elles 3:4 of Holland coſt 3 pound, 6 ſhillings, 1 penny, halfe-penny, what will

956 elles 1:2 cost at that rate? Multiply 3 pound, 6 shillings, one penny, halfe-penny which is 3|3625 fourths by 756|5 primes, makes 2543|73125; which divided by 34 ells, 3:4, or by 34|75, makes 73|200 thirds or 73 pound, 4 shillings.

Example.

	1.2.3.4
	3|3625
	7565
	168125
	201750
	168125
	235375
	2543|73125

6|93	
2124|28	1.2.3
2543|73125	(73|200
347555555	
347777	
2444	
33	or 73 l. 4 s.

If 346 pound, 10 shillings gaine 32 pound 8 shillings, what will 75 pound gaine at that rate? First, multiply 32|4 primes by 71 makes 2430|0 prime; which divided by 346|5 primes, makes 7|0129 fourths, or 7 pound, 3 pence for the answere.

Example.

3 2 4	3		
7 5	1 0 4 2		
1 1 6 2 0	4 3 3 5 0	*l*	1.2.3.4
2 2 6 8	2 4 3 0 0 0 0 0 0	(7	0 1 2 9
2 4 3 0 0	3 4 6 5 5 5 5 5		
	3 4 6 6 6 6		
	3 4 4 4		
	3 3		

The same Question wrought a second way.

Divide 32|4 primes, by 346|5 primes, adding 5 cyphers, and the quotient will be 935 fourths; which multiply by 75, makes 7*l*. 0125 fourths, which doth lack, or want one farthing of the former summe.

The same Question wrought another way.

Divide 75 pound, adding 5 Cyphers by 346 pound, 5 primes, and the Quotient will bee 21645 fifths; which multiply by 32|4 primes, makes 7012980; from which abate 6 figures,

6 figures to the right hand, because of your 6 fractions and the remainer will be 7 pound 0126 fourths, &c. as before. And in this manner you may worke any question in the Rule of Three, 3 severall manner of wayes, and proove the worke one by the other.

If 12 shillings doe buy 74 pound of Ginger, how much shall I have for 100 pound? Divide 7400, which is the product of 74 by 100, by 12 shillings, or 6 primes, and the quotient will bee 12333 pound, 1:3, and so much Ginger shall I have for 100 pound at that rate; or otherwise divide 100 pound by 6 primes, makes 166 2:3, which multiply by 74, makes 12333 pound, 1:3, as before.

Briefe Rules how to abbreviate your worke in the Golden Rule, by marking the proportions betweene the numbers given.

When as any Question is propounded in the Golden Rule, marke what proportion is betweene the first and second numbers, or betweene the first and third numbers, or betweene the third and second; for if you espie them in any proportion, the Question demanded is very speedily answered, upon the first sight; or yet if you see them not exactly to bee even proportionals, yet you may

may subtract the first from the third, once twice or three times, or more and so often take the middle numb r towards the answer to the Question, and then you neede not to multiply by your whole third number, as you shall see by examples following.

1 *Example.*

If 34 ells cost 2 pound, 4 shillings, 1 penny, what will 340 elles cost? Heere comparing the first and third numbers, one with another, I find the third doth containe the first 10 times, wherefore I multiply 2 pound 4 shillings, 1 penny by 10, and the Totall is 22 pound, 10 pence, the Answere.

2 *Example.*

If 82 ells of Cloth cost 4 pound, 2 shillings, what will 324 elles cost at that rate? Heere I find 4 pound, 2 shilling in Decimals to bee one halfe of 82, but it standeth one roome leffe in value then 82 doth, so I conclude, that halfe of 324 one roome leffe is 16 pound, 2 primes, or 4 shillings, the Answer.

3 *Example.*

If 345 ells of Holland cost 34 pound, 10 shillings, what will 789 ells cost at that rate?

Set

Set downe 34 pound, 10 shillings in Decimalls, makes 34 pound, 5 primes, which is the first number placed but 1 roome lower; therefore I say, if 345 elles cost 34 pound, 5 primes one roome more to the right hand, then the third number also will cost 78 pound, 9 primes 1 roome more to the right hand, which is 78 pound, 18 shillings.

4 *Example.*

If 12 ells of Cloath cost 2 shillings, foure pence, 4:5 of one penny, what will 356 elles cost? place 2 shillings, 4 pence, 4:5 in Decimals, makes 1 prime, 2 seconds, or 12 seconds, which is the same number: but it stands two roomes lower; therefore I conclude, that 356 ells cost the same numbers two roomes lower, which is 3 pound, 11 shillings, 2 pence, 2:5 of one penny.

If 12 ells cost 12 seconds, what will	1.2 35 6	00 356	l. 1.2 or 3. 5 6

5 *Example.*

If 136 ells of cloth cost 26 pound, what will 3759 ells cost at that rate? I find the second number to bee twice the first, but it stands

ſtands one place nearer the right hand, therefore I conclude, that the third number will coſt twice aſmuch in his lower roome which is 75 1 pound, 16 ſhillings.

If 130 coſt 26 pound, what coſt 3759.

	3759		*l.*	
130	375	9	75	8
26		2		
	781	8		

6 Example.

If 75 ells 1 half coſt 7 pound, 11 ſhillings, what will 328|12 ſeconds coſt? Set them downe in Decimalls, and you ſhall find them to ſtand thus, 75|5 primes for the firſt number, and 7|55 ſeconds for the ſecond number, which is the ſame one roome nearer the right hand: ſo I conclude, that the third number will coſt 32|85 ſeconds, which is 32 pound 17 ſhillings.

Example.

Ell.	1.2		1.2
75	5	328	50
7	55	32	85

The anſwer 32 *l.* 17 *s.*

Example.

If 356 ells of Canvas coſt 38 pound, 11 ſhillings,

hillings, 1 penny, what will 740 ells coſt at hat rate? Firſt, divide 740 by 356, the quo-ient will be 2 and therfore I take twice the rice given for that quotient, & then wheras efore I ſhould have multiplied 38 pound, 12 hillings, 1 penny by 740, I ſhall neede to multiply it but by 2 & the remaynor, and di-ide it by 356, makes 31368 fourths, to be dded to the former ſum, and the total will be 2 in the example following.

Example.

l.	*s.*	*d.*			*d.*
38.	12.	1	38	6	1
			2	8	
740			76	8	
			8		
			768		
			4	2	
			772		
			8		
			780		
			4	10	2
			784		
			4		
			788		
			4		
			792		
			4		

pound, 6 primes by 28, omitting the penny, not setting it out in Decimalls, and the Product is 108019 primes: then multiply 1 penny by 28, makes 28 pence, which is one prime, 166 fourths, and the totall was 1080 pound, 9116 fourths, as in the example: and in this manner you may save a great labour in multiplying your number of pounds and shillings first, and then multiply your pence by themselues, and adde into the rest in primes, seconds, &c.

2 Example.

If 17 ells of Holland Cloth cost 3 pound 2 shillings, 5 pence, what will 515 ells cost at that rate? Divide 515 by 17, makes 30, by which multiply 3 pound, 2 shillings, 5 pence, makes 93 pound, 12 shillings, 6 pence, then the remayner of your division will be 5 ells, by which 5 multiply 3 pound, 2 shillings, 5 pence, makes 15 *l.* 10 shillings, 1 penny, or in Decimalls 15|50416 fifthes; which divided by 17, makes 912 thirds, or 18 shillings, 3 pence almost; which added to 93 pound, 12 shillings, 6 pence, makes the answer to be 94 pound, 10 shillings, 9 pence: and so here in stead of multiplying 3|120833 sixths by 515,

and

and dividing by 17 I have saved more then halfe the worke.

Example.

	l.	*s.*	*d.*			
5						
525(30.	3.	2.	5	3.	2.	5
27	30.			5		
17						
	93.	12.	6	15.	10.	1
		18.	3			
	94.	10.	9			

23	1.2.3.4.5
25504416	(91200
277777	
2222	

3. *Example.*

If 7 pound buy 100 pound waight of Sugar, how many pound waight will 156 buy me at that rate? Diuide 156 by 7, makes 22, 2 : 7. by which multiply 100, makes 2228 pound, 4 : 7

Exampl.

4 Example.

If 356 pieces of Callicoes coſt 300 pound, 15 ſhillings, how much will 917 pieces coſt at that rate? Divide 917 by 356, makes in the Quotient 2; therefore take the price given twice, and there will remaine after your diviſion 205; by which multiply 300|75 ſeconds, makes 61653|75 ſeconds; which divided by 356, makes 173 pound, 18 ſeconds, or 173 pound, 3 ſhillings 8 pence, to bee added to the former ſum 601 pound, 10 ſhillings, makes 774 pound 13 ſhillings, 8 pence, for the Queſtion.

The ſame queſtion wrought without Reduction in Decimalls.

If 356 coſt 300|75 ſeconds, what 917? Multiply 300|75 ſecond by 917, makes 275787|75 ſeconds, which divide by 356, makes 774|68 ſeconds, or 774 pound, 13 ſhillings, & pence, as before the proofe.

Example.

Example.

300	75		23	
9	17		12640	
			265631	l. 1.2
2105	25		27378775	(774168
3007	5		3564866	
270675			35559	
			333	
375787	75			

5 Example.

If 179 pound of Indico coſt 60 pound 13 ſhillings, 5 pence, what will 716 pound coſt at the ſame rate? divide 716 by 179, makes 4 in the quoſient, and nothing will remaine: wherfore I conclude, that 4 times 60*l.* 13 *s.* 5 *d.* which is 242 *l.* 13 *s.* 8 *d.* and is the anſwere to the queſtion demanded.

6 Example.

If 36 pound of Cloves coſt 11 pound, 6 ſhillings, how many pound ſhall I have for 354 *l.* Divide 1113 primes by 36, makes 31388 fifths; which multiply by 354, cutting of figures for the 5 Fractions, makes 111 pound, 113 52 fifths, or 3 pound, 2 ſhillings 2 pence, 3 farthings for the anſwer.

Fellowſhip in Decimalls.

To worke the Rule of Fellowſhip in Decimalls, gather the whole number of all the moneys diſburſed into one ſumme, and then divide the money gained or loſt by that ſumme, and multiply that Quotient ſo found by each ſeverall partners ſtocke diſburſed, and the Products will bee each ſeverall mans gaine or loſſe.

1 Example.

Foure Merchants made a company: *A.* put in 60 pound, *B.* 80 pound, *C.* 120 pound, *D.* 140 pound, and they gained 72 pound; the Queſtion is, what part each Merchant muſt have of the gaines? Firſt the Totall ſumme of all their moneys diſburſed was

400

400 pound, wherefore according to the rule I divide 72 pound, adding Cyphers unto it by 400, and the Quotient is one prime, 8 seconds; by which I multiply each severall mans Stock disbursed, and I find, *A.* shall have 10 pound, 16 shillings; *B.* 14 pound 8 shillings; *C.* 21 pound 12 shillings, and *D.* 25 pound, 4 shillings; totall is 72 pound, as in the example.

Example.

60	80	120	140
18	18	18	18
480	640	960	1120
60	80	120	140
10|80	14|40	21|60	25|20

A. 10. 16.

3	18	72|00
7200 (18		14|40
4400		21|60
		25|20
		72|00

2 Example.

Foure Merchants made a company, and set forth a ship to sea, which cost them 3616 pound, 13 shilling; *A.* must pay 1:3 of the money; *B.* 1:4, *C.* 1:5, *D.* 1:6, the question is, what each man must pay of the said summe? Take a number wherein the like parts may be had which in the former book of vulgar Arithmatick, I find to bee 60, whereof 1:3 is 20, and 1:4 is 15, and 1:5 is 12, and 1:6 is 10, the totall is but 57: wherfore I divide 3616|65 by 57, and the quotient is 63|45 seconds; which I multiply by 20, and I find *A.* shall pay 1269 pound; then I multiply by 15, and *B.* shall pay 951|75 second; and by 12, and *C.* shall pay 761|4 primes; and by 10, and *D.* shall pay 634|5 primes, the totall is 3616|65 seconds, the proofe of the worke.

Example.

Example.

l	1.	2.	*l*	1.	2.	*l*	1.	2.	*l*	1.	2.
63	4	5	63	4	5	63	4	5	63	4	5
	2	0		0	5		8	0		0	8
1269	0	0	951	7	5	761	4	0	634	5	0

3 Example.

Three Merchants made a Company: *A.* put in 56|6 primes; *B.* put in 39|8 primes; *C.* put in 120|4 primes, and they gained 58 pound, 16 shillings, or 58 pound, 8 primes, what must each man have of the gaines? first, the Totall disbursed is 216 pound, 4 primes; by the which I divide 58 pound, 8 primes, and the quotient is 27107 fifths for one pound gaines; which I multiply by each severall mans money disburted, and I find *A.* shall have 15 pound, 17 shillings, 10 pence halfe-penny; *B.* 10 pound, 14 shillings, 3 pence, 3 farthings; *C.* shall have 32 pound, 11 shillings, 9 pence, 3 farthings; the Totall 58 pound, 16 shillings, the proofe.

Example.

	l.	1.2.3.4.5.6	l.	s.	d.	q
A.	15	392502	15	7	10	2
B.	10	785618	10	14	3	3
C.	32	690794	32	13	9	3
tot.	58	799914	58	16	00	0

4 Example.

Three Captaines agree together to divide a spoyle or booty, which they had taken, containing 7851 *li.*; in this forme A. is to have 1:2, B. 1:3, C. 1:4, the Question is, what each mans share shall be? Find a number which hath such parts in it, *viz.* 12, whereof 1:2 is 6, 1:3 is 4, and 1:4 is 3, which in one summe makes 13, therfore divide 7851, adding Cyphers to it by 13, and the Quotient will bee 603 pound, 9207 fifthes, which multiply by 6, 4, and 3, and you shall find, A. shall have 3623 pound, 55284 fifthes, B. shall have 2415 pound, 69128 fifthes, C. shall have 1811 pound, 76921 fifthes; the Totall is 7850 pound,

99991

99991 fifths, which doth want but 1 fourth of 7851 pound, which in value is but 3:125 parts of 1 penny, and this example is to bee wrought without the Golden Rule. Behold the proofe of the worke.

Example.

	l.	1.2.3.4.5	*l.*	*s.*	*d.*	*q*
A.	3623	53842	3623.	10.	9.	1
B.	2415	69228	2415.	13.	10.	1
C.	1811	76921	1811.	15.	4.	1
	7850	99991	7851.	0000.		0

The same example wrought another way.

After you have divided 7851 pound by 13, find in your Decimall Table what the Quotient is in Coyne, makes 603 pound, 18 shillings, 5 pence, *ob.* which multiply by 64, and 3, and their Totall in one summe is the answer, as before.

l.	*s.*	*d.*		*l.*	*s.*	*d.*
603	9.	5.	*ob.*	603	9.	5. *ob.*
	6				4	
3623	5.	9.	00	2415	65.	10. 0

l.	*s.*	*d.*	
603	9.	5.	*ob.*
	3		
1811	75.	4.	*ob.*

These three severall Products added into one sum, makes 7850 *l.* 19*s.* 11 *d.* wanting but one penny in the whole summe, which is the defect of the Decimalls, which cannot be exactly set out in crynne; but it will serve to answer a Question of one million with one penny errour at the most.

Example.

Three men made a stocke together, and they gained 244 pound, 8 shillings; *A.* put in 315 pound 7 moneths, *B.* 408 pound 10 moneths, *C.* 500 pound 3 moneths; now the question is, what each man must have of the gaines?

gaines ? First, multiply each mans stocke by his time, and gather all the Totalls into one summe, and they make 7785; by which divide your gaines, 244 pound 4 primes, and the quotient will bee 2 1393 sixths; which multiply by the severall Products of each mans money and time, and the Totall of each severall Product is the summe desired for each mans part of the gaine.

Example.

A.	1	69	22	83	6	69	4	6	4
B.	1	47	10	88	00	20	47	9	1
C.	1	88	10	82	80	12	8	1	88	00
		244	400	56	244	80	00	2	1

Position in Decimalls.

The Merchants bought a parcell of Linnen Cloth cost them 77 pound 1 shilling whereof *A.* must pay 1 : 4 : 6 : 4 : 5 what must each man pay of this sum ? I take for my number wherein I can have those parts viz. 1400 20 is 5 and 1 of 20 is 1 which is 80 so is 2 pound 5 primes or 2 one halfe

halfe, their totall is 11 pound, 5 primes, or 11 1:1; by which I divide 757 pound, 85 seconds, and the Quotient is 65 *l.* 9 primes, which I multiply by 5 for *A.* makes 329 pound, 10 shillings; *B.* 263 pound, 12 shillings; *C.* 164 pound, 15 shillings: the totall is 757 pounds 85 seconds.

1 Example.

	B.		C.		
A.	*l.*		*l.*		1.1
l. 10	68	9	65	0	164	75
65	98	1	4	1	263	16
					239	5
329	5	263	6			
					757	85

2 Example.

A Ship-carpenter bought 300 Timber trees of a Gentleman, and was to pay for the first 100 a summe of money unknowne, for the second twice almuch as for the first 100, and for the third 100 of trees he was to pay thrice as much as he payd for the first, and the whole 300 of trees cost him 724 pound,

pound, 12 shillings, the Question is, what each hundred cost him severally? To worke this Question, or any other of like nature, suppose a unite, or one pound for the first 100, then he must pay two pound for the second 100, which is twice as much, and then also hee must pay 3 pound for the third hundred, which is three times as much as the first: but yet 1 pound, 2 pound, and 3 pound makes but 6 pound, and it should bee 724 pound, 12 shillings, so that now whereas in the former Booke I taught you to resort to the Golden Rule for the answere, saying; If sixe pound come of my position one pound, of what comes 724 pound, 12 shillings. Now alwayes supposing a unite for your first number, you shall save a multiplication; and so dividing of 724 pound, 6 primes by 6, I find the first 100 of Trees cost him 120 pound, 15 shillings, 4 pence, and the second 200 cost him 241 pound, 10 shillings, 8 pence, and the third 100 cost him 362 pound, 5 shillings, the totall makes 724 pound, 12 shillings, behold the worke.

Example

Example.

The Proofe.

2 Example.

Foure Merchants consent to build a ship, cost them 74 pound, 16 shillings, whereof *A.* must pay a certaine summe of money unknowne; *B.* must pay twice as much as *A*; *C.* must pay twice as much as *B*; and *D.* must pay as much as all the other three, viz. as *A*, *B*, and *C*; now the question is, what each man must pay of this summe? I suppose *A* must pay 1 pound, then *B.* must pay two pound, which is twice as much as he doth pay; and *C.* must pay 6 pound, which is thrice as much as *B.* doth pay; and then *D.* must pay 9 pound, which is as much as all the other three doe pay: but their Totall is

but

but 18 pound, and it should bee 541 pound, 16 shillings: wherefore I divide 541 pound, 8 primes by 18, & the quotient is 30 pound, 1 prime, or 2 shillings for the first part. Then B. must pay 60 pound, 4 shillings: C. 180 pound, 12 shillings, and D. 270 pound, 18 shillings; their Totall makes 541 pound, 8 primes; behold the worke.

Example.

541 8 (30	A. 30	2
18	B. 60	4
388	C. 180	12
22	D. 270	18
	540	36
The proofe.	1	2
	541	38

4 Example.

A Cesterne of water containing 600 gallons is filled with water, and hath 4 severall Cocks to empty the same, whereof if they be all set open at once, the Cesterne will bee empty in 24 houres: now the second Cocke will avoyde twice as much as the first Cock in

in 24 houres, and the third will avoide three times as much as the first, and the fourth Cocke 5 times as much as the first; the question is, how many gallons each Cocke doth avoide in 24 houres of the said 600 gallons?

I. Suppose the first Cock will avoyde one gallon, then the second must avoyde 2, and the third 3, and the fourth Cock 5: but yet they are but a 11 gallons, and they should be 600 gallons: wherefore dividing of 600 by 11, the quotient is 54 gallons, and 6:11 of a gallon for the first Cocke. Behold the worke in the example following.

Example.

1.1	66 Gallons.		Gallons.
2.2	600 (54 6/11	1.	54. 6
3.3	330	2.	109. 1
4.5	2	3.	163. 7
		4.	272. 8
11			600. 22

The Proofe.

Of

Of Gaine and Losse in Decimalls.

If a Broad Cloth 28 yards long bee sold for 14 shillings a yard, and the seller doth gaine 10 pound in the bargaine ready money, what cost that broad Cloth? First by Practice find the price of the 28 yards, at 14 shillings a yard, makes 19 pound, 6 primes, or 19 pound, 12 shillings; divide 19 pound 6 primes by 110 pound, makes 17 pound, 81818 fifthes, or in Coyne, 17 pound, 16 shillings, 4 pence, 3 farthings.

Example.

7 | 2|9600000|0|17|81818

1916

Secondly, if 28 yards cost 17 pound, 81818 fifthes, what is one yard cost at that rate? Divide 17 pound, 81818 fifths by 28 yards, and the quotient will be 63636, or in Coyne, 12 shillings, 8 pence, 3 farthings for the price that one yard cost.

Exampl.

Thirdly, for the proofe of this worke say, If one yard cost 63636 fifthes; how may I sell it to gaine 10 pound in the hundred ready money? Take the tenth part of 63636 fifths, makes 63636 sixths; which added into one Totall, makes 69999 fifthes, which doth want but one fifth of 7 primes, or 14 shillings, which prooves all the former workes to be true.

2 Example.

A Merchant doth deliver money at intereſt for 9 moneths after the rate of 12 pound in the hundred for 12 moneths ſimple intereſt, and at the end of 9 moneths doth receive for intereſt 87 pound; the queſtion is, what was the ſum lent? Anſwere: becauſe the intereſt of 9 moneths at 12 pound in the hundred is 9 pound, divide 8700000 by 9 pound, and the quotient is 966 pound, 6666 fourths, or 966 pound, 13 ſhillings, 4 pence, the ſumme lent.

Example.

666		*l.*	1.2.3 4
8700000	(966	6666	
999			

3 Example.

If 13 pieces of Canvas coſt 17 pound, 12 ſhillings, how may I ſell them to gaine 8 pound in the hundred? Multiply 17 pound 6 primes by 8, adding two Cyphers, makes for 19 pound, 8 thirds, or 19 pound, 2 pence almoſt.

The proofe of the former example, if 17 pound,

pound, 12 ſhillings, gaine 1 pound, 8 ſhillings, 2 *d.* what will 100 pound gaine at that rate? Multiply 1 pound, 8 ſhillings, 2 pence; or in Decimalls, 1 pound, 408 thirds by 100, makes 140 pound, 800 thirds; which divide by 17 pound, 6 primes, makes 8 *li* for the rate that 100 pound will gaine, which ſhewes, the former worke to bee truely wrought.

Example.

	l. 1.2.3
17	600
	8
1	408
19	008

	0	*l.*
140	800	(8 *the proofe.*
	276	

4 Example.

If in one ell of cloath ſold for 3 ſhillings, there bee gained after the rate of 12 pound in the hundred for 12 moneths, how ſhould that ell have beene ſold to gaine 17 pound in

in the hundred for 12 moneths? Multiply 17 pound by 3 shillings, which is 1 prime, 5 seconds, and divide the Product by 12, makes 2125 fourths, or in coyne 4 shillings 3 pence, and so much must it have bin sold for to gaine 17 pound in the hundred.

Example.

17		
15		
	236	l. 2. 3. 4.
85	259000	(2125 or 4 s. 3 d.
17	22222	
	222	
295		

Secondly, if 3 shillings give 12 pound, what will 4 shillings, 3 pence give? Multiply 2125 fourths by 12, and divide by 15 seconds, and the quotient is 17 pound, the proofe of the last example.

Example.

12.3.4			
2125		200	l.
12		259	00 (17
		259	
55500		2	

5 *Example.*

5 Example.

A Merchant sold 24 Clothes, which cost him 342 pound, wherein he lost after the rate of 10 pound in the hundred, and tooke in exchange 560 pieces of Rayſons at 24 ſhillings the piece, wherein he gained 10 pound in the hundred ready money; now the queſtion is, what his gaine or loſſe was, and what ſum of money her was to pay for the Rayſons? Firſt, 560 pieces of Rayſons at 24 ſhillings a piece, is 672 pound, from which ſubtract 342 pound, leaves 330 pound to pay for the Rayſons. Secondly, 672 pound, at 10 pound in the hundred, is 67 pound, 4 ſhillings for his gaines by the Rayſons. Thirdly, 342 pound leſſe, 10 in the 100, is 34 pound, 4 ſhillings, to be deducted from 342 pound; and then take 34 pound, 4 ſhillings, from 67 pound 4 ſhillings, leaves his gaines more then his loſſe to be 33 pound.

Example.

Example.

pieces.			
560	672		
12			342
	67	2 *gains.*	
672	34	2	34 2 *losse.*
342			
	33	0 *cleare gaines.*	
330 *to pay.*			

6 Example.

A Merchant receiveth for principall and intereſt 352 pound, wherein her gained 9 pound in the hundred for one yeare; now the Queſtion is, what was the ſum of money lent? Divide 35200000 by 109 pound, makes 322 pound, 9357 fourths, or 322 pound, 18 ſhillings, 8 pence, half-penny for the ſumme lent.

Example.

6 Example.

1
3.3368
2.922935 l. 1.2.3.4
35.000.0000 (3.2.1.9.3.5.7
1.8.9.9.9.9.9
1.0.0.0.0.0
1.1.1.1

7 Example.

A Merchant hath owing unto him, 540 pound, to be paid at the end of three years, now his debtor will pay him ready money, if he will abate him 9 pound in the hundred. Divide 540 pound with Cyphers by 109 three times one after the other, and the third Quotient will bee the summe that he shall pay in ready money, abating 9 pound in the hundred interest upon interest. Behold the worke following.

7 Example

7 Example.

```
  5423
20495411
54000|000 (49541200
20999998
  200000
   2222

   490
   5997
48542|200 (4545 06
20999880
  200000
   2222

   2
  70843
 2866274      l. 1.2.2
45450|000 (416 | 974
20999990
  200000
   2222
```

or 416 *l.* 19 *s.* 6 *d.*

The

The proofe is made by multiplying the last Quotient by 9, and that Product againe by 9, and thirdly againe by 9, makes 540 pound, wanting but one fifth, which is but 3:1750 parts of 1 penny, or 6:875 parts of one farthing.

8 *Example.*

A Merchant hath owing unto him 532 pound, to be paid at the end of 12 moneths, now his debter will pay him ready money, if hee will abate him 12 pound in the hundred *per annum*. Diuide 632 by 112 pound, and the quotient will be the sum of money that will discharge the debt, abating 12 pound in the hundred.

Example.

```
          306
      748264        l. 1.2.3
63200000000  (564285
 22222222222
  2222222
    2222
```

or 564*li.* 5 *s.* 8 *d. ob.*

9 *Example.*

9 Example.

324 pound was received for intereſt money lent a Merchant Adventurer at 17 pound in the hundred 1 yeare, what was the ſumme lent? Anſwere: divide 32400 by 17, makes 1900 pound, and 1:17 of a pound.

10 Example.

If 358 ells of Holland coſt 124 pound, 16 ſhillings, how ſhall it be ſould an ell to gaine 12 pound in the hundred ready money? Firſt multiply 124 pound, 8 primes by 12, adding 2 Cyphers, makes 139 pound, 776 or in coine 139 pound, 15 ſhillings, 6 pence. Secondly, divide 139 pound, 776 by 358, makes 3905 fourths, or 7 ſhillings, 9 pence, 3 farthings for the price to ſell one ell to gaine 12 pound in the hundred.

Example.

l.	1.2.3
124	800
	12
14	976
139	776

	21
3235	1.23.4
239776	(3905
358888	
3555	
333	

11 *Example.*

If one ell of cloth coſt 18 pence, how ſhall I ſell 358 ells to gaine 7 pound, 10 ſhillings by the bargaine, and at what rate in the hundred doe I gaine? Firſt, 358 ells at 18 pence an ell makes 26 pound, 17 ſhillings; to the which adde 7 pound, 10 ſhillings, the gaines makes 34 pound, 7 ſhillings for to ſell 358 ells, to gaine 7 pound, 10 ſhillings by the bargaine. Secondly divide 7 pound 500000 ſixths by 26 pound, 17 ſhillings, ſeconds, and the quotient is 27 pound, 93446 fourths, or 27 pound, 18 ſhillings, 9 pence farthing, which is the rate gained by the 100 pound of money.

Example.

Example.

elles.

358 *d.*
75 18

2578

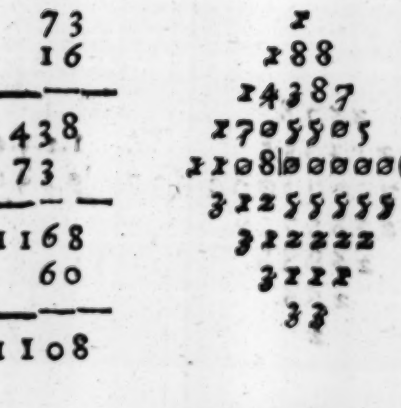
1790 2130550 *l.* 1.2.3.4
2506 750000000 (27 93346
2685555
26|850 26888
7|5 266
2

34|35 *price.*

12 *Example.*

How much Indico of 6 shillings, 3 pence a pound will pay for 73 broad clothes at 16 pound 1 cloth, and to pay 60 pound in present money? First, 73 broad clothes at 16 pound a cloth makes 1168 pound, from which subtract 60 pound, there will remaine 1108 pound; which divide by 6 shillings, 3 pence, or 3125 fourths, and the Quotient is 3545 pound, 9:10 of one pound, and so much must he give of Indico for the clothes.

Example.



13 *Example.*

How many pounds of Cloves at 6 ſhillings a pound, and ſmall Sinamond of 3 ſhillings a pound muſt be given for 36 Carleyes, at 4 pound, 3 ſhillings a piece, to have of each a like number of pounds? Anſwere: 36 Carleys, at 4 pound, 3 ſhillings a piece, makes 149 pound, 8 ſhillings, which divided by the price of both, *viz.* 9 ſhillings, makes 332 pound of each ſort.

The proofe: 332 pound of Cloves at 6 ſhillings a pound, makes 99 pound, 12 ſhillings; then 332 pound of Sinamon at 3 ſhillings,

lings a pound, makes 49 pound, 16 ſhillings, the totall is 149 pound, 8 ſhillings, the given price of the 36 Carſeys.

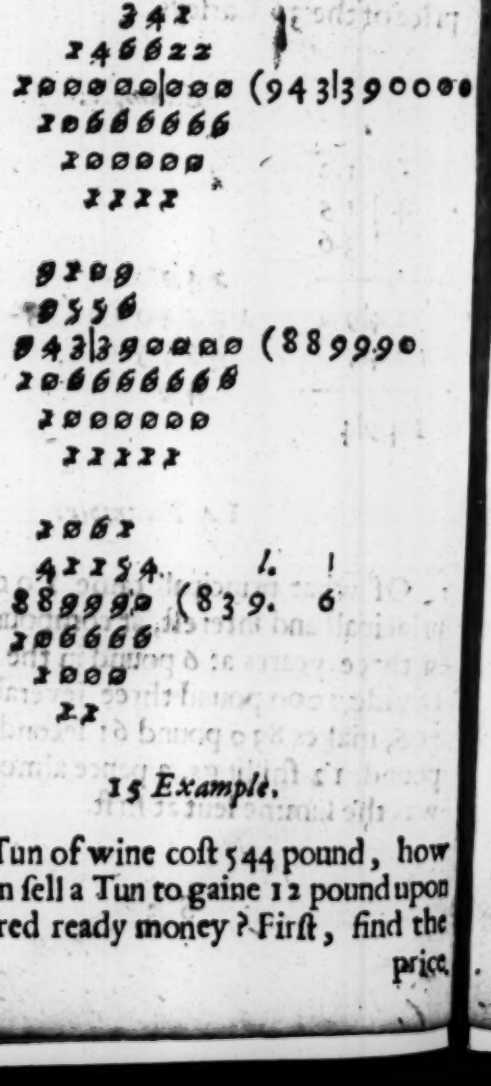
Example.

l.	1.2	
4	15	
	36	
		249
24	90	249|4000 (332 *l.* of each.
124	5	447
		44
149	4	

14 *Example.*

Of what principall came 1000 pound principall and intereſt, at compound intereſt in three yeares at 6 pound in the hundred? Divide 1000 pound three ſeverall times by 106, makes 839 pound 61 ſeconds, or 839 pound, 12 ſhillings, 3 pence almoſt, which was the ſumme lent at firſt.

Example.



15 Example.

If 34 Tun of wine coſt 544 pound, how may a man ſell a Tun to gaine 12 pound upon the hundred ready money? Firſt, find the price

price of 1 Tun, dividing 544 by 34, makes 16 pound for the price of one Tun which it coſt; then multiply 16|00 by 12 pound, makes 17 pound, 92 ſeconds, or 17 pound, 18 ſhillings, 4 pence, 4 5 of a penny, for the price to ſell one Tun of that Wine to gaine 12 pound upon the 100 pound.

```
                                  1.2
20          l.          16|00
544  (16                 |12
344                  ---|---
 3                    1|92
                     -------
                     17|92
```

How to worke gaine and loſſe in pence, and parts of Pence or Farthings.

Set out your number of pounds, ſhillings, pence and farthings in pence, and in tenths of one penny; and for one farthing, ſet out 2 primes, 5 ſeconds, which is one fourth of a penny, and for two farthings ſet out five primes, which is one halfe-penny; and for three farthings ſet downe ſeven primes, 5 ſeconds, which is three quarters of one penny, and then they are apt for decimall ope-

rations both for multiplication, diuision, or any other worke of Arithmatick, without reducing them into farthings, and there will be a great deale of labour saued in these kinds of operations, as shall appeare afterwards by the examples following.

1. Example.

What is the interest and principall of 100 pound, put forth at 10 pound in the 100 compound interest, for the space of 7 yeares to bee all receiued at the end of the tearme? First, put your 100 pound into pence, maketh 24000 pence; then worke as in this example following, and you shall find it will amount vnto 46769 pence, and 1 : 5 of one penny; which diuided by 240 pence, makes 194 pound, 17 shillings, 5 pence, 1 : 5 of a penny, which is the summe that 100 pound will amount vnto at interest vpon interest in 7 yeares at 10 pound in the hundred.

Example.

Example.

	pence.	
100 pound makes —	24000	
	2400	
1 Yeare —	26400	
	2640	0
2 Yeare —	29040	
	2904	0
3 Yeare —	31944	0
	3194	40
4 Yeare —	35138	40
	3513	84
5 Yeare —	38652	24
	3865	2.24
6 Yeare —	42517	464
	4251	7464
7 Yeare —	46769	2104.

221 d.
22107 l. 1
467690 (194. 8
244440
222

Totall 194 l. 17 s. 5 d. 1:5

2 *Example.*

A Merchant delivered 358 pound at intereſt for three yeares for 8 pound in the hundred compound intereſt; the Queſtion is, what it will amount unto at the end of the terme? Put your money into pence, makes 85920 pence; which multiply by 8, adding 2 Cyphers, and worke for 3 yeares, as in the example following.

Example.

Example.

	d.
358 pound is —	8 5 9 2 0 0
	1 8
	6 8 7 3 6 0
1 Yeare —	9 2 7 9 3 6 0 0
	0 0 0 0 0 0 8
	7 4 2 3 4 8 8
2 yeare —	1 0 0 2 1 7 0 8 8 0 0
	0 0 0 0 0 0 0 0 8
	8 0 1 7 3 6 7 0 4
3 Yeare —	1 0 8 2 3 4 4 5 7 0 4 *d.*

22 18 *d.* *l.*

2 1 0 8 2 3 4 4 0 (4 5 0 | 9 s. or 450 *l.* 19 *s.* 6 *d.*

2 4 4 4 4 0

2 2 2

The proofe of the former example in Decimalls.

A certaine Merchant received for principall and interest upon interest 450 pound 19 shillings, 6 pence, which was for money lent at 8 pound in the hundred for 3 yeares now the Question is, what was the summe lent? Place 450 pound, 19 shillings, 6 pence in Decimalls, and you will find your third Quotient will be 358 pound, wanting some few seconds, which prooves the worke good.

3 Example.

A Merchant lent 112 pound for 6 months at 17 pound in the hundred, for 12 moneths, the question is, what hee shall receive? Put your money into pence, makes 26885 pence; marke out your prime line, as in the former examples, and adde 2 Cyphers, then multiply by 17, and take halfe that product for 6 moneths interest, and adde into the principall, and the totall is the sum of pence which he shall receive for principall and interest at 6 moneths end.

Example.

Example.

112 pound is — 26880 | 00
00000 | 17

2688 | 6
1881 | 0

4569 | 6 *totall.*

2284 | 8 *one half added.*

29164 | 8 *the sum sought*

Makes 121 *li.* 10 *s.* 4 *d.* 4:5 of a *d.*

4 Example.

If a pound of Sinamond cost 4 shillings ready mony, how may it be sold to gaine 12 pound in the hundred to give 6 moneths time? Set your 4 shillings in pence, makes 48 pence; then adde 2 Cyphers, and multiply by halfe the intereſt, and adde them into 1 sum, and the product will be 50 pound, 88 seconds, or 4 shillings, 2 pence, 2:25 of one penny for the price to sell 1 pound to gaine 12 pound in the hundred for 6 months time.

5 Example.

4 Example.

d.	112
48	00
	6
2	88
50	88.

Makes 50 pence, 9:10 of a penny almoſt.

5 Example.

If 112 pound waight of Cloues coſt 33 pound, 12 ſhillings, how may I ſell them to gaine 14 pound in the hundred, and give 4 moneths time? Firſt, ſet downe 33 pound, 6 primes; then adde 2 Cyphers, and multiply by 14, makes 4 pound, 704 thirds, of which take the third part, becauſe 4 months is the third part of 1 yeare, which is 1 pound, 568 thirds; which added into one totall, makes 35 pound, 3 ſhillings, 4 pence, halfe-penny for the price to ſell 112 pound to give 4 moncths time, and to gaine 14 pound in the 100 in 12 moneths.

5 Example.

33 | 600
| 14

1 | 344
3 | 36

4 | 704

1 | 568

35 | 168

6 Example.

If I gaine 8 pound, 15 ſhillings in 100 pieçes of Linnen Cloth, what doe I gaine in the 100 at that rate, when as the 100 pieces are ſold for 52 pound 10 ſhillings? Firſt, ſubtract 8 pound, 15 ſhillings, from 52 *l.* 10 *s.* and there will remaine 43 *l.* 15 *s.* then ſay, If 43 pound, 15 ſhillings gaine 8 pound, 15 ſhillings, what will 100 pound gaine? Divide 875000 by 43 pound, 15 ſhillings, or 43 pound, 75 ſeconds, and the Quotient will be 17 *l.* 14 *s.* 4 *d.* in the 100.

Example.

7 Example.

If in 112 pound waight of Sugar, sold for 7 pound, 12 shillings ready money, there were gained 11 pound in the hundred, what did one pound cost at first penny? First, divide 7 pound, 6000000 by 111 pound, which is the principall and interest given, and the Quotient is 6 pound, 84684 fifthes, which 112 pound cost ready money. Secondly, divide that quotient by 112 pound, makes 61132 sixths, or 14 pence, 3 farthings for the price that one pound cost at first penny.

8 Example.

If 300 pieces of Lawne cost 321 pound, 4 shillings, how may I sell them to loose 15 pound in the hundred? First, take the rate what one cost, by dividing 321 pound, 3 primes by 300, makes 1 pound, 0706666 sevenths, or 1 pound, 1 shilling, 5 pence almost, for the price that 1 piece cost. Secondly, take the interest of 1 0706666 sevenths at 15 pound in the 100, and subtract it, and then it makes 91006 sixths, or 18 shillings, 2 pence, 2:5 of a penny for the price to sell one

piece

piece to loose 15 pound in the 100 ready money. Thirdly, for the proofe of this work, say; If 1 piece cost 910067 sixths, what will 300 pieces cost at that rate? Multiply 910067 sixths by 300, & cut off 6 figures to the right hand, makes 273 pound, 5 pence almost for the sum received for 300 pieces to loose 15 pound in the 100. Fourthly, for a second proofe; take the interest of 321 pound, 2 primes at 15 pound in the hundred losse, and deduct it from 321 pound, 2 primes, & there will remaine 273 pound, 5 pence almost, which doth proove all the other works to be truely wrought.

Example.

22222	*1.1.2.3.4.5.6*
321|2000000	(1|706666
3333333300	
1076666600	1.2.3.4.5.6
15	910067
	300
160599	
910067	273|020100

The

	1.2.3
3 2 1	2 0 0
	1 5
4 8	1 8

2 7 2 | 0 2 *The Proofe.*

9 Example.

If in one ell of Cloth sold for 3 shillings, 2 pence, halfe-penny, there were gained 10 pound in the hundred ready money, what did that ell cost? Answere: set 3 shillings 2 pence *ob.* in Decimals, makes 38 pence, 5 primes; then divide 38 pence, 5000 fourths by 110 pound, makes 35 pence, the price that one ell cost.

Example.

5
38|5000 (35 pence, the price
2200 one cost.
220

10 *Example.*

10 *Example.*

If in one ell of Cloth sold for 35 pence, 19 seconds, there were gained 7 pound in the hundred ready money, what did that ell cost, when there was 6 moneths time given? Divide 35 pound, 1900 fourths by halfe the interest, adding one 100, which is 103 pence, 5 primes, and the Quotient is 34 pence, the price that the ell cost.

474 d.
35 1900 (34
2035
203

11 *Example.*

A Merchant lent money at 10 pound in the hundred for 100 pound profit for 12 moneths, and at the end of 6 moneths he received principall and interest 356 pound, the question is, what was the sum lent? Divide 356 pound, by 105 pound, which is the halfe yeres Interest and principall, and the quotient is 305 pound, 5:105 of a pound for the sum lent.

Exampl

Example.

9
4199 l.
35600 (339 5:105 of all.
20555
200
1

12 Example.

If 17 pound looſe 12 ſhillings, what will 100 pound looſe? Divide 60000 fifthes by 17, makes 3 pound, 529 thirds, or 3 pound 10 ſhillings, 7 pence in the hundred pound.

13 Example.

If 37 yards of velvet coſt 32 pound, how muſt one yard bee ſold to gaine 9 pound, 10 ſhillings in the hundred? Firſt, 32 pound the price at 9 pound, 5 primes the hundred, makes 35 pound, 4 ſeconds; which divide by 37, makes the price of one yard to bee 9470. fifthes, or 18 ſhillings, 11 pence, *ob.* to ſell one yard to gaine 9 pound, 10 ſhillings in the hundred.

ſol 11 01 Example.

Example.

l.	1.2.3	
32	000	
	95	*a*
		2761 1.2.3.4
2	160	392400 (9470
	88	3777
		33
35	040	

or 18*s.* 11*d. ob.*

Exchange in Decimalls.

1 *Example.*

IF 1 pound ſterling be 1 pound, 14 ſhillings, 6 pence Flemiſh, what is 783 pound ſterling in Flemiſh money? Set out 1 pound, 14 ſhillings, 6 pence in Decimalls, makes one pound, 725 thirds; which multiply by 783 pound, makes 1350 pound, 675 thirds, or 1350 pound, 13 ſhillings, 6 pence.

Pounds Shillings *Example.*

Example.

l.	1. 2. 3
1	7 2 5
	7 8 3

	1. 2. 3
	2 7 5
	7 8 3

5	1 7 5	
1 3 8	0 0	
1 9 0 7	5	
1 3 5 0	6 7 5	

	8 2 5	
2 2	0 0	
1 9 2	5	
2 1 5	3 2 5	

l.	1. 2. 3
2 1 5	3 2 5
1 3 5 0	6 7 5
1 5 6 6	0 0 0

The Proofe.

2 *Example.*

If one pound exchange bee 5 ſhillings, 6 pence, what is 783 pound? Set 5 *s.* 6 *d.* in Decimalls, makes 275 thirds; which multiply by 783, makes 215 pound, 325 thirds, or 215 pound, 6 ſhillings, 6 pence; which added to the laſt example, is 1566 pound, and ſo much as the double of the ſumme given, viz.

viz. of 783 pound, becauſe the 2 prices given, makes juſt 2 pound, and this by working a ſecond Queſtion in exchange, the firſt is prooved to be truely wrought, as appeareth in the example above.

3 *Example.*

If one pound exchange bee 1 pound, 17 ſhillings, 7 pence, half-penny, what is 1000 pound at that rate? Set 1 pound, 17 ſhillings, 7 pence halfe-penny in Decimalls, makes 1 pound, 88125 fifths; then becauſe 1000 hath 3 Cyphers, adde 3 Cyphers, and cut off 5 figures, and the anſwer is 1881 pound, 5 ſhillings.

1881	1.2
	25000

4 *Example.*

A Merchant doth receive 134 pound, 6 ſhillings for the exchange of one hundred pound ſterling from Middleborough, what was one pound ſterling in Flemiſh money? Place 134 pound, 6 ſhillings in Decimalls, is 134 pound, 3 primes; then becauſe 100

pound

pound hath 2 Cyphers, cut off two figures more to the left hand, and it will be 1 pound, 343 thirds; or in Coyne, one pound, 6 shillings, 11 pence farthing, for the exchange of one pound at that rate.

l. 1.2.3	*li.*	*s.*	*d.*	*q.*
1|343	or 1.	6.	11.	1

5 Example.

A Merchant doth receive 645 pound, 12 shillings for exchange money, at 1 pound, 7 shillings, 6 pence for 1 pound sterling, the question is, how much sterling money he did deliver? Divide 645 pound, 6 primes by 1 *li.* 375 thirds, or 1 pound, 7 shillings, 6 pence, makes 469\|5268 fourths, or 469 pounds, 10 shillings, 6 pence, 1 farthing for the sterling money delivered.

6 Example.

If 1 *l.* sterling be 1 *l.* 7 *s.* 6 *d.* Flemish, what is 110 *l.* Elemmish in Sterling Coine? Divide 100 pound by 1 pound, 375 thirds, makes 72 pound, 72727 fifths; or 72 pound 14 shillings, 6 pence, *ob.* that 100 *l.* makes.

7 Example.

7 *Example.*

If the exchange bee from Rome to London at 69 pence sterling one Duckat, how many Duckats shall bee delivered at Rome for to receive 356 pound, 16 shillings sterling at London? Answere. Divide 356 pound, 8 primes by 2875 fourths, which is 69 pence, and the Quotient will bee 1241 Duckats, 3 pence.

```
      3 1
    2 2 8 0 2
    6 9 3 0 0 5
  3 5 6 8 0 0 0 (1241 Duckats,&
  2 8 7 5 5 5 5 there remaines 3 d.
    2 8 7 7 7
      2 8 8
        2
```

8 *Example.*

If the exchange bee from London unto Awerpe at 23 shillings, 5 pence, 3 fardings Flemmish the pound sterling, how much money must bee deliuered at London, to receive 146 pound, 14 *s.* 10 pence, 3 *q.*

in Flemiſh money? Anſwer: Divide 146 pound, 744775 ſixthes, by 1 pound, 3 ſhillings, 5 pence, 3 farthings, which is 1 pound, 173958 ſevenths, and the quotient is 125 pound; and ſo much muſt he deliver at London to receive 146 pound, 14 ſhillings, 10 pence, 3 farthings in Flemiſh Coyne at that rate.

Example.

586979
29348952 *l.*
146|744775 (125
1173958222
117395888
11739 8

9 Example.

A Merchant doth deliver at Antwerp 200 pound Flemiſh by exchange for London at 22 ſhillings, 10 pence Flemiſh for 1 pound ſterling, how much muſt he receive at London? Anſwer: divide 200 pound by 1 pound 141666 ſixthes, which is 22 ſhillings, 10 pence; makes 175 pound.

A generall Rule for exchange in Decimals.

If the price of a unite bee given, then alwaies divide the ſum of money wheron the queſtion dependeth by that unite in decimals, and the quotient is the anſwere to the queſtion.

1 *Example.*

A Merchant doth deliver 100 pound ſterling by exchange for Rome, at 72 pence ſterling for 1 Duckat *De Camera*; the queſtion is, how many Duckets hee muſt receive at Rome for his 100 pound ſterling? Heere the price of one Ducket is given to be 72 pence, which is 6 ſhillings, or $\frac{3}{10}$ primes; wherefore I divide 100 pound by 3 primes, & the quotient is 333 pound, $\frac{1}{3}$ of a pound, or 6 ſhillings, 8 pence for anſwer to the queſtion.

2 *Example.*

A Merchant doth deliver 756 pound ſterling at London, to receive Duckets at 66 pence ſterling, the price of one Ducket, the queſtion is, how many Duckets hee muſt receive at Venice? Divide 756 pound by 66 pence, which is 275 thirds, and the quotient is 2748 Duckats, and 300:2750 of 1 Ducket for the Anſwere.

3 *Example.*

A Merchant at Venice doth deliver 1000 Duckets, to receive at London 287 pound, 10 ſhillings ſterling, what is one Ducket? Set downe 287 pound, 5 primes, and divide by 1000 Duckets, makes at 5 ſhillings, 9 pence for one Ducket.

1.2.3.4

287|5000(2875

2000000

222

Makes 5 *s.* 9 *d.* one Ducke

4 *Exam*

4 *Example.*

A Merchant at Venice doth deliver 800 Duckats by Exchange for London at 64 pence, *ob.* the Ducket ſterling money, the Queſtion is, how much ſterling hee muſt receive at London? Set out 64 pence, halfe-penny in Decimalls, makes 26875 fifthes; which multiply by 800, and cut off 5 figures becauſe your fractions are 5, and the product will be 215 pound ſterling.

1.2.3.4.5
26875
800

215|00000

Makes 215 pound ſterling.

5 *Example.*

A Merchant doth deliver 1000 duckets by Exchange for London at 71 pence ſterling for one ducket, how much muſt hee receive ſterling money at London? Set out 71 pence in decimalls, makes 2958 fourths, 1:3, & adde

3 Cyphers for 1000, and cut off 4 figures, makes 295 pound, 8 primes, 1:3, or 295 pound, 16 shillings, 8 pence for the answer.

l.	1			
295	8	0	0	0

Makes 295 *l.* 8 primes, 1:3

6 Example.

One penny Flemmish is 3:5 of one penny sterling, and 1 pound Flemish is 3:5 of one pound sterling or 12 shillings; wherefore to convert Flemish money into sterling Coyne, multiply your Flemish money by 3:5, which in decimalls is 6:10, or 6, and the product will be the value of your Flemish money in sterling Coyne. In 345 Flemish, how much sterling Coyne? Multiply 345 by 6 primes, and the product is 207 pound sterling.

	l.	1
In 345		
	6	
207	0	

	l.	12
In 7856	6	
	62	
4714	08	

7 Example.

7 Example.

In 756 pound, 18 shillings sterling, how much Flemish coyne, when 1 penny Flemmish is 3:5 of a penny English? Devide 756 pound, 9 primes by 6 primes, makes 1261 pound, 5 primes, or 10 shillings.

1303	*li.*	
756|90	(1261	5
66666		

Reduction of Measures from one place to another.

IF you will reduce the measure of 1 Countrie into the measures of another: As if you would reduce the measures of *Antwerpe, Gaunt, Brudges, Sivill, Roaven*, or of any other Countrey, into the measures at *London*; learne first the order of measuring of all sorts of commodities in both places, either out of the experience of Merchants and Tradesmen in those places, or out of the best and latest approoved Authors that have written tables to that effect and note, that 4 ells at London makes 5 yards, and 100 ells at London is at

	Elles.
Antwerpe	166 ½
Gaunt short measure	164
Gaunt long measure	154
Brudges	164
Arras	165
Calice	157
Lisse	166
Mastrich	173
Cullen	208
Franckfort	208
Noremberge	174
Dantringe	139
Roven	103
Paris	95
Licons	100

Genua		480 ½ Palmes.
Millian		214 Braces.
Florence		188 Braces.
Venice	for Silke hath	196 Ells.
	for Linnen hath	180 Ells.
Rome		56 Cana.
Lisborne		100 Varras.
Madera		104 Varras.
Sevile		135 Varras.

These I have taken out of Mastersons *Arithmatick.*

The

The difference of 1 hundred elles, Palmes, Varras, or Braces, being found of any place from London; if you would convert the measures of any of those places to London measure: as for example, If you would convert 356 elles of Brudges measure into elles at London; you shall find in the Table, that 164 ells makes 100 at London; then by the Rule of Three say,

1 *Example.*

If 164 be 100, what are 356 ells? Multiply 356 by 100, and divide by 164, makes 217 ells, 12:164 of an ell, which 356 at Brudges will make in London. But according to the order of Decimalls, if you will bring the measures of other places to those of London: Set your number of 1 hundred found in the Table, to a unite in Decimalls, as in the last example 164 stands thus 1|64 seconds, then you neede but divide your number 356 by 1 pound, 64 seconds, and the Quotient is 217 ells, 12 164 ells, as in the last example.

Againe, if you would reduce London measure to the measures of any other place: Find

the number of 100 to that place, and set it decimalls, and multiply your number of elles at London by those numbers found, and the product will be your desire.

2 Example.

In 758 ells at London, how many elles at Dantzing, I find in the Table 139 ells there, make 100 at London; so I set 139 to a unite, and it is 1 pound, 39 seconds; by which I multiply 758, makes 1053 ells, 62:100 parts.

1 Example.

221
2862 *Ells.*
3560 | 217. 12:164
26444
269
2

2 Example.

758 | 00
1 | 39
---
68 | 22
227 | 4
758 |

1053 | 62

3 Example.

3 Example.

If 166 ells 1:3 at Antwerp bee 100 ells at London, how many ells at London are 1756 ells at Antwerpe? Set 166, 2:3 to a unite, makes 1 pound, 66 seconds, and 2:3 of a second: Or otherwise; 1 ell, and 2:3 of 1 ell, by which divide 1756, makes 1053, 1:2

5070
8 9470 2 *Ells.*
1756 0000000 (1053 1:2 almost.
1666666
266666
1666
16

4 Example.

In 3258 ells at London, how many Braces at Millian? Find 214 for 100 at London, so that if you set 214 to a unite, it will bee 2 pound, 14 seconds; by which multiply 3258, makes 6982 Braces, and 12:100 parts of a Brace.

And in this manner you may easily convert your Measures or Waights from one place to another, either by Multiplicati. n

or Diviſion, without the Golden Rule: but of this, if it pleaſe God to lend me life and health, I doe purpoſe to ſpeake in a Treatiſe at large of Decimall Arithmatick for the good of my Country-men and others, if I find theſe my labours and indeavours to bee acceptable and beneficiall to others, and will better informe my ſelfe by Merchants, who have had experience in the Reduction of Waights and Meaſures from place to place; in the meane time here is a foundation laid to worke upon; let the difference bee what it will, and ſo for this time I will end this Treatiſe of Decimall Arithmatick, and goe in hand with ſome operations of Annuities, as followeth.

Of

Of Interest and Annuities.

How to frame Tables to worke Interest and Annuities, or purchases at any rate.

FOrasmuch as these kind of operations of Interest and Annuities are very tedious and troublesome, if they be to be wroght for many yeares, although I have already in the former Booke set forth many severall manners of working those kind of questions after a more easie kind of method, then heretofore hath beene published by any other in the like kind whatsoever, yet here I have thought good also in this place to shew the wayes, whereby any man that is desirous to be satisfied in the reasons or grounds of those kind of workes, may be able to calculate for his owne use a Table or Tables, whereby to abbreviate those kind of operations by Multiplication, or Division, onely without the helpe of the Golden Rule, or any tedious Reductions of Multiplications and Divisions for many yeres to come at one onely operation, as shall appeare by the examples following.

How

How to calculate the Table or Breviat of 10 pound in the hundred Compound Intereſt.

If you will calculate a table for 10 pound in the hundred compound Intereſt for 21 or 30 yeares; Place your numbers, as in the examples following, beginning with a unite, or 1, adding 7 Cyphers unto it, and then take the tenth part of that, which is the ſame numbers one roome more to the right hand, and adde them into the firſt numbers, & the totall will be the ſum for the firſt yeare, and ſo you muſt worke for the ſecond, third, fourth, &c, untill 21, or 30 yeares; but here you ſhall note, that you ſhall not neede to ſet downe in your Breviate more then 8, 9, or 10 numbers at the moſt, for becauſe the reſt wilbe ſuperfluous, as for example.

Example.

Example.

Int. 1.2.3.4.5.6.7.8	*Veres*	*Int.* 1.2.3.4.5.6.7.8	*Veres*
1 | 00000000 | 0 1		2 | 35794769 | 9 23579476	
1 | 10000000 | 1 11		2 | 59374246 | 10 25937424	
1 | 21000000 | 2 121		2 | 85311670 | 11 28531167	
1 | 33100000 | 3 1331		1 | 38428371 | 12 31384283	
1 | 46410000 | 4 14641		3 | 45227121 | 13 34522712	
1 | 61051000 | 5 16151		3 | 79749833 | 14 37974983	
1 | 77156100 | 6 17715 61		4 | 17724816 | 15 41772481	
1 | 94871710 | 7 19487171		4 | 59497298 | 16 45949729	
2 | 14358881 | 8 21435888		5 | 05447028 | 17 50544702	
2 | 35794769 | 9		5 | 55991731 | 18 55599173	
		6 | 11590904 | 19	

Here

Here you may see in this Table the manner of gathering the Breviate of 10 pound in the hundred, Compound interest, which you may extend to what number of yeares you please, only adding a unite in the eight place, as you see the figures in the ninth place doe arise, and now I will here set downe the Breviate from one yeare unto 40 ready gathered.

The

The Breviate of 10 pound in the hundred for 40 Yeares.

Yers	1.2.3.4.5.6.7.8	Yeres	1.2.3.4.5.6.7.8.9
1	11000000	21	740024990
2	12100000	22	814027490
3	13310000	23	895430240
4	14641000	24	984973260
5	16105100	25	1083470590
6	17715610	26	1191817650
7	19487171	27	1310999410
8	21435888	28	1442099360
9	23579476	29	1586309290
10	25937424	30	1744940220
11	28531167	31	1919434240
12	31384283	32	2111377660
13	34522712	33	2322515430
14	37974983	34	2554766970
15	41772481	35	2810243670
16	45949729	36	3091268030
17	50544702	37	3400394840
18	55599173	38	3740434320
19	61159090	39	4114477750
20	67274999	40	4525925530

How

How to calculate a Table or Breviate at any rate under or above 10 pound in the hundred Compound Intereſt.

If you would calculate a Table or Breviat any rate under or above 10 pound in the hundred compound intereſt, place a unite with 7 Cyphers to it; then if you will calculate for 12 pound in the hundred, or 16 pound; ſet your 12, or 16 under the 2 firſt Cyphers next the unite, and multiply your unite, omitting the Cyphers by your intereſt, and adde the product into 1 totall, and the ſum is the principall and intereſt for the firſt yeare, and ſo worke againe for the ſecond, third, &c. To finiſh your Table, as aforeſaid, at 10 pound in the hundred. But if your intereſt be under 10 pound in the hundred, place your number of the intereſt under the ſecond cypher from your unite, and worke as is in the example following.

Example

Example.

Int.	1.2.3.4.5.6.7.8	Tens	Int.	1.2.3.4.5.6.7.8	Tens
1	00000000 80		1	36048896 8	4
1	08000000 8	1		10883904	
	864		1	46932800 8	5
	16640000 8	2		11754624	
	93312		1	58687438	6
	25971200 8	3	1	71382422	7
	10077696 0001				
	36048896	4			

In this manner you may proceede infinitely: and thus much shal suffice for making these Breviats.

The

The Breviat of 8 *pound in the hundred* per annum *Compound Interest for* 30 *yeares.*

Yeres	1.2.3.4.5.6.7.8	Yeres	1.2.3.4.5.6.7.8
1	10800000	16	34259426
2	11664000	17	37000180
3	12597120	18	39961194
4	13604889	19	43157010
5	14693280	20	46609571
6	15868743	21	50338337
7	17138242	22	54365404
8	18509302	23	58714636
9	19990046	24	63411807
10	21589249	25	68484751
11	23316389	26	73963532
12	25181701	27	79880614
13	27196237	28	86271063
14	29371936	29	93172748
15	31721691	30	100626506

The vſe of theſe Breviates and Tables, and of all others of like nature in working of queſtions of Intereſt and Annuities.

1 *Rule.*

To find what will be the amount of one pound forborne for any number of yeares by compound intereſt after any rate *per cent:* ſo that you have a Breviate for the rate propoſed. Enter the Breviate for the rate propoſed, and find in the left margine, &c. the number of yeares, and from that number ſo found, cut off ſeven figures, the anſwere is in pounds, primes, ſeconds, thirds, fourths, &c. for the anſwere to the queſtion demanded.

1 *Example.*

What is one pound put foorth at intereſt compound, at 10 pound in the hundred worth, to bee paid at the end of 18 yeares? Find the eighteenth number in the Breviat, which is 5|559173; from which cut off ſeven figures to the right hand, and the anſwere is 5 pound, 11 ſhillings, 2 pence, 9.

Example.

l. 1.2.3.4.5.6.7

5|5 5 9 9 1 7 3 Makes 5 *l.* 11 *s.* 2 *d.* 1 *q.*

2 *Example.*

2 Example.

What is 100 pound due at 7 yeares end worth to bee paid at the end of the terme, at 10 in the hundred compound intereſt? Find the ſeventh number in the table of 10 *l.* in the hundred, makes 19487171; to the which adde 2 Cyphers, becauſe 100 pound hath 2 Cyphers, and cut off 7 figures to the right hand, and the ſum is 194 pound, 87171 fifths for the Anſwere.

l. 1.2.3.4.5
19487171 00, Or 194 *l.* 17 *s.* 5 *d.* almoſt.

3 Example.

What will 758 pound for 6 yeare make at 10 pound in the 100 compound Intereſt, to be paid at the end of the terme? Find the ſixth number in the Table of 10 pound in 100, which is 17715610; which multiply by 758, the money named in the queſtion, and the product, cutting off 7 figures to the right hand, makes 1342 pound, 16 ſhillings, 10 pence, *ob.* almoſt.

1,2.

1.2.3.4.5.6.7
1771561 0
7 5 8

14172488 0
8857805 0
1240092 70

1342843238 0

2 *Rule.*

How to find what any yearely Annuity will make to bee paid all at the end of the terme? First, find the number of yeares of the annuity given, and from the number answering, deduct a unite in the first place to the left hand, and adde a Cypher to the last figure to the right hand, and cut off 7 figures to the right hand, and the answer is found.

1 *Example.*

What will 1 pound annuitie make, to bee payd for at the end of the terme of 16 yeres at 10 pound in the hundred compound intereſt? Find the ſixteenth number in the Table of 10 pound in the hundred, and ſubtract a unite from the first figure to the left hand.

adding more Cyphers, will bee your answere in pounds, primes, seconds, thirds, &c.

1. Example.

What is 1000 pound due at 7 yeares end worth in ready money, at 10 pound in the 100 compound interest? Find the seventh number in the Table of 10 pound in the 100, which is 19487171, this is your Divisor. Then adde 7 Cyphers to 1000 pound, makes 10000000000; or add more Cyphers, marking out your prime line in your dividend, to find out how many figures your Quotient will have in whole numbers, and the rest will bee primes, seconds and thirds; this is your dividend, and then divide by your divisor, makes 513 pound, 3 shillings, 2 pence.

1582

2232500

208225x

25427783

2664245795 *l. 1. 2. 3*

20000000000000 (513|158

19487171111111

19487177777

1948711111

194871111

19487

Having

Having found what 1000 pound due at 7 yeares end is worth in ready money, if you will find what 100 pound, or 10 pound, or 1 pound is worth in ready money; place your Quotient in Decimalls, and marke out your prime lines, cutting off 1 figure for 100 pound, 2 for 10 pound, or 3 for 1 pound, the answere is as followeth.

Example.

For 100 *l.*	For 10 *l.*	For 1 *l.*
l. 1.2.3.4	*l.* 1.2.3.4.5	1.2,3.4.5.6
5 1|3 1 5 8	5|1 3 1 5 8	5 1 3 1 5 8
51 *l.* 6 *s.* 3 *d.* 3 *q.*	5 *l.* 2 *s.* 7 *d.* 2. *q*|10 *s.* 3 *d.* 1 *q.*	

2 Example.

What is 750 pound due at 5 yeares end worth in ready money, at 10 pound in the hundred compound intereſt? Find the fifth number in the Table of 10 pound in the hundred, which is 161051 00 for diviſor; then place 10 Cyphers before your number given 750 pound, and marke out your prime line, and divide by your diviſor, and the quotient will be 465 pound, 13 ſhillings 10 pence for the anſwer to the queſtion given.

Example.

1
246
222259
9265848
2037964542 *l.* 1.2.3
7500000000000 (465691
2620522222222
262052555558
26205222
2620529
262
2

Makes 465 pound, 13 ſhillings, 10 pence.

3 Example.

What is 847 pound due at 21 yeares end worth in ready money, at 10 pound in the hundred compound intereſt? Find the 21 number in the Table of 10 pound in the hundred for Diviſor, which is 74002499; then ſet 10 Cyphers to your numbers given, makes 847000000000 for your dividend; then divide, and the quotient will be 144 *l.* 9 *s.* 1 *d.* 1:5 of 1 *d.* the anſwere.

Example.

Example.

4139
4214218
33721219
329725144
2069750121445 *l.* 1.2.3
847000000000000 (114455
740024999999
74002499999
7400244444
740022222
74000
740

Makes 114*l.* 9*s.* 1*d.* 1:5 of a penny.

4 Rule.

How to find what any yearly Annuities for any number of yeares is worth in ready money at 10 pound in the hundred compound intereſt. Enter the Table of 10 *l. per cent.* with your number of yeares given, and from the numbers found ſubtract a unite in the firſt place, and place a Cypher in the laſt for your Dividend; which divide by the

number found in the table againſt your yeres given, and the quotient is the anſwer to the queſtion.

1 Example.

What is 100 pound *per annum* annuity for 21 yeres worth in ready money at 10 pound in the hundred Compound Intereſt? Looke in the Table of 10 pound in the hundred for 21 yeres, & ſubtract a unite in the firſt place, and adde a Cypher in the laſt, makes 640024990: Divide this by 7408 1499, the 21 number, adding cyphers, and marking the prime line, and the quotient is 864 pound, 17 ſhillings, 4 pence, 3 farthings for the anſwere to the queſtion demanded.

Examp.

562
4161 7 7
3603177113
4800499864869 *l. 1. 2. 3*
6400240099000000 (864869
7400249999999
7400249999999
7400244444
740022 2
74002
740.

2 *Example.*

Having found what 100 pound annuitie will amount unto, if you would know what 10 pound, or 1 pound annuity will amount unto, or 1000 pound in 21 yeares; plaid it in Decimalls, and cut off 1, 2, or adde 3 Ciphers to the last, or remove 3 places, and you shall find your demand.

Example.

Example.

1000 *li.*	100 *li.*
1.2 3	1.2.3
8 6 4 8 | 6 9 0	8 6 4 | 8 6 9
8648 *l.* 13 *s.* 9 *d.* 3 : 5	864 *l.* 17 *s.* 4 *d.* 3

10 *l.*	1 *l.*
1.2.3.4	1.2.3.4.5
8 6 | 4 8 6 9	8 | 6 4 8 6 9
86 *l.* 9 *s.* 8 *d.* 3 : 4	8 *l.* 12 *s.* 11 *d.*

3. Example.

What is 546 pound yearely annuity fo
yeares worth in ready money, at 10 pou
the hundred compound intereſt?

Find the fourteenth number in the Br
ate of 10 pound in the hundred; from it
tract a unite in the first place, and adde a 3 fh
pher, makes 279749830; which mult
by 546, makes 152743407180; which d
vide by 37974983, the 14 number in th
Breviate, makes 4022 pound, 4 shillings,
pence, 3 farthings.

4

40
4208
8b2b897
0883473535447 l. r. 2. 3. 4
2327439271 0000(4022 1 1 1
2797489333332
279748888888
27974999990
2797444
279777
2799
37

Makes 4022 l. 4 s. 2 d. 3. 4.

If a summe of money due at the end of any number of yeares specified, bee bought after any rate *per Cent:* compound intereſt for a price knowne: to find what that ſumme due at the end of that terme is.

1 Example.

There is a Debt bought for 513 pound, 3 ſhillings, 2 pence ready money, which was due at 7 yeares end, now the Queſtion is, what the debt was at 10 pound in the hundred compound intereſt? Set your money paid in Decimalls, makes 513|158; which

multiply

multiply by 19487171, the number against 7 yeares, cutting off 10 figures, makes 999 pound, 999 thirds, wanting but one third of 1000pound; wherefore I conclude, the debt was 1000 pound, which was due at 7 yeares end.

2 *Example.*

There was a Debt bought for 600 pou which was due at 4 yeeres end, what wa that debt at 10 pound in the hundred com pound interest? Multiply 60 pound by th numbers against 4 yeres, which are 1464100 makes 878 pound, 4600000 sevenths, or Coyne 878 pound, 9 shillings, 2 pence, 2:5 of 1 penny for the sum of that debt.

1464 1000
600
878 4600000

Makes 878 *l.* 9 *s.* 2 *d.* 2:5 of a penny

FINIS.